











SIXTH ANNUAL REPORT

OF THE

MASSACHUSETTS

HIGHWAY COMMISSION.

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JANUARY, 1899.

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# Commonwealth of Massachusetts.

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*To the Honorable Senate and House of Representatives of the Commonwealth  
of Massachusetts in General Court assembled.*

The undersigned commissioners, appointed under the provisions of chapter 476 of the Acts of 1893, entitled "An Act to provide for the appointment of a Highway Commission to improve the public roads, and to define its powers and duties," herewith submit their sixth annual report.

THOMAS C. MENDENHALL.

W. E. McCLINTOCK.

CHARLES W. ROSS.

BOSTON, MASS., Jan. 4, 1899.



LIST OF OFFICERS OF THE MASSACHUSETTS  
HIGHWAY COMMISSION.

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|----------------------------|---|-----------|-----------------------|
| THOMAS CORWIN MENDENHALL,  | } | . . . . . | <i>Commissioners.</i> |
| WILLIAM EDWARD MCCLINTOCK, |   |           |                       |
| CHARLES WILSON ROSS,       |   |           |                       |

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|-----------------------------|-----------|------------------------|
| CHARLES MILLS,              | . . . . . | <i>Chief Engineer.</i> |
| AUSTIN BRADSTREET FLETCHER, | . . . . . | <i>Secretary.</i>      |

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|-------------------------|-----------|----------------------|
| JOHN MICHAEL MCCARTHY,  | . . . . . | <i>Clerk.</i>        |
| WALTER EDWIN HITCHCOCK, | . . . . . | <i>Book-keeper.</i>  |
| MARY ALOYSIUS RILEY,    | . . . . . | <i>Stenographer.</i> |
| EDWARD AUGUSTUS AUSTIN, | . . . . . | <i>Messenger.</i>    |

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| LOGAN WALLER PAGE, | . . . . . | <i>Geologist.</i> |
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# ANNUAL REPORT

## OF THE

### MASSACHUSETTS HIGHWAY COMMISSION.

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In accordance with the provisions of chapter 340 of the Acts of 1897, \$200,000 of the \$800,000 appropriated under that act became available on Jan. 1, 1898. As was anticipated, this was a wise provision, as it enabled the commission to begin its operations in the field as soon as the season was favorable, without waiting for such appropriation as the Legislature might see fit to make. In its estimate for the year 1898 the commission requested an appropriation of \$600,000 for that year, with the condition, as before, that \$200,000 should be available for expenditure only after Jan. 1, 1899.

Before the time came for the committees of the Legislature to act upon this recommendation, the United States had entered upon a war with a foreign country, the early conclusion of which could not be foreseen, and which necessarily involved unusual and extraordinary expenditures on the part of the Commonwealth. Under these conditions, it was deemed necessary and desirable to reduce the amount appropriated to \$400,000, with the condition that \$100,000 should be available only after Jan. 1, 1899. On June 17, 1898, the act was passed making this appropriation, and there was thus at the disposal of the commission during the year 1898 the sum of \$500,000, which included \$200,000 of the appropriation of the year 1897. There remains, also, \$100,000 which the commission can expend after Jan. 1, 1899.

In addition to the roads already laid out and accepted as State highways during the year 1898, 225,352 feet were laid out

(42.68 miles), the length at the ending of the year being 1,171,841 feet, or 221.94 miles. The number of miles of road actually completed during the year was 46, making a total of 206 miles of completed State highway up to the present time. Of these, 162 miles have been finally accepted by the commission. In all recent contracts a clause has been inserted providing for the formal acceptance of a road only after two months of actual use by the public, beginning with the date on which the work of construction is declared to be finished by the engineer of the division in which the road is located. The season for road building was practically closed on November 25, and a number of sections laid out and partially constructed remain to be completed when suitable weather shall come in the spring.

In spite of an earnest and continued effort on the part of the commission to hasten the work of building, there have been many vexatious and apparently unavoidable delays, and in some instances the travelling public have been not a little inconvenienced thereby. Much attention has been given to this matter, and one or two plans have been hit upon, by means of which it is hoped the delay may be greatly lessened. In a large measure the officials of the town or city in which a road is to be built are responsible for it. The law requires the commission to allow these officials the privilege of taking the contract at fixed prices, if they so desire. It also allows them to hold the matter under consideration for thirty days after the receipt of the contract and prices as fixed by the commission. In many cases the matter is held under consideration by municipal authorities up to the very limit allowed under the statute, and then the privilege of contracting waived. Only after the expiration of this time can arrangements be made for letting to private contractors; and, as this requires advertising and a formal opening and examination of bids, it will be readily understood that at least six weeks and often two months may pass after the commission has completed its part of the transaction before work upon the road is actually begun. Again, town officials will often accept the contract at the last moment, and then find themselves quite unprepared to begin work, so that several weeks will be lost in making this preparation. But there is still further delay after the work has been begun. Naturally, a con-



tractor, whether a private individual or a municipality, will desire to execute his contract in a manner most favorable to his own interests. Some towns do not appear to be especially anxious to hasten the work when it is once begun, and this is especially the case where the contract has been taken with a view to furnishing work for the citizens of the town. Private contractors are sometimes the lowest bidders for several sections of road, located perhaps in widely separated parts of the State. Not wishing to increase equipment or greatly enlarge their working forces, they adopt a policy of postponement or delay which it is not easy to break down.

Delay which arises from conditions governed by the statute cannot well be avoided. In order to break up as far as possible that growing out of the dilatoriness of the private contractor, the commission some time ago resolved to insert in all future contracts a clause fixing liquidated damages for failure to complete the contract within the time limits agreed upon. It is believed that the rigorous enforcement of this provision will very decidedly hasten the operation of construction under private contract. When contracts are taken by the town officials, it would seem that, as the interests of the municipality which they represent demand that construction should proceed as rapidly as possible, no coercive measure should be necessary. Unfortunately, experience has shown that, while in general this is a sound theory, there are not a few cases to which it is inapplicable, and it is evident that some effective remedy ought to be devised. A plan which, if adopted, is sure to result in some improvement, is suggested later in this report.

A full account in detail of the work done during the year on each of the several roads under construction will be found in the Appendix to this report.

#### MEETINGS OF THE COMMISSION.

The commission has held 67 meetings at its office in Boston during the past year, besides many others in different parts of the State. Regular hearings, as provided for by the statute, were held in every county in the State, with the single exception of the county of Nantucket. At the time agreed upon for this hearing, it was impossible for the members of the com-

mission to reach the island, owing to the violent storm, which, beginning on November 26, lasted for several days, and practically interfered with all methods of transportation in that direction for nearly a week. As in this county there is only one road of importance, and as that has already been almost completely laid out and constructed as a State highway, the hearing is largely a matter of form, and its omission of little consequence.

Much general interest has been shown in the county hearings; the attendance has generally been large, and the commission has profited much by the suggestions and criticisms which these meetings have brought forth.

Besides these general county meetings, the commission has had many special hearings in relation to particular petitions, mostly at its office in Boston. About 210 of these have occurred during the year. The demand for them is very great during the months immediately preceding an allotment of funds for road building. During this time the applications to be heard are so numerous that it has often been necessary to restrict each town to a period of fifteen or twenty minutes in the presentation of its case. Experience has proved that in nine cases out of ten, or even in greater proportion, this is sufficient, and in the large majority of hearings the full time allowed was not consumed. Usually the argument is made by one man, who leaves little for those who follow him except confirmation of his statements. In very many cases the circumstances are already well known to the members of the commission, and it thus follows that the apparently short time allotted has been generally quite enough. Whenever those asking for a hearing requested a longer time, or indicated their intention to be represented in considerable numbers, a half an hour or an hour was given; and it was only in a few instances, where proper notice to the commission was not given, that there seemed to be any dissatisfaction on account of the limits necessarily set. It is hoped to avoid even this by the plan adopted for these hearings after Jan. 1, 1899. It has been so arranged that a group of towns, having common interest in a proposed State highway, or in several alternative routes, shall be heard at one time, the period allowed being extended to an

hour, or more if necessary. It is believed that this plan will afford more ample opportunity for freedom of discussion, and secure to the commission a better basis of local opinion on which to act.

#### CONTRACTS.

In the two previous annual reports of the commission it has discussed at some length the policy, enforced by law, of awarding contracts for building State roads to municipal authorities; and it is neither necessary nor desirable to repeat here the reasons for believing that, on the whole, the provisions of the statute are wise. It does appear desirable, however, to refer again to certain methods of procedure, fortunately not common, which occasion more or less difficulty in the adjustment of the relations of the commission to contracting towns or cities. The contract prices which are agreed to by both parties are fixed by the commission, on the recommendation of its chief engineer, after a careful study of local conditions as to material supplies, cost of transportation, wages of labor, etc. The estimates of these items are generally liberal to the municipal authorities; and it is certain that in a great majority of cases it is possible to execute the contract without loss to the town or city, and in many cases there is something of a surplus. Occasionally, however, there is a very considerable deficit, which is sometimes relatively very large. In such cases appeal is almost certain to be made to the commission to make good in whole or in part the loss thus sustained. Examination almost invariably shows that this loss is largely, and sometimes, it is believed, entirely, due to careless business methods on the part of the town or city authorities. This is often evident in the payment of wages considerably higher than the normal rate of the locality, in the employment on the State road contract of inefficient and incapable labor, and in other ways of a like character. It may be claimed that these are matters which need not concern the Highway Commission; but, as a matter of fact, the Commonwealth suffers in no small degree through the delays that necessarily accompany this state of affairs, especially as it compels the maintenance of engineering supervision during a much longer period. The commission is particularly desirous of having it understood

that it cannot be expected to favorably consider requests to be reimbursed for losses of this character. Whenever losses have occurred on account of errors or omissions on the part of its engineers, the Commonwealth may properly deal liberally with the contractor, although not required to do so by the terms of the contract; but it should not undertake to make good those for which it is in no way responsible, and which ordinary prudence and business ability would have avoided.

During the year 66 contracts were made by the commission, of which 35 were with town or city authorities and 31 with private individuals or firms. The average cost of construction under public and private contract remains, as reported a year ago, essentially the same. In Appendix B all contracts made during the year are shown, with prices in detail.

#### PETITIONS.

During the year 52 new petitions for State highways were received, making the total number up to and including December, 1898, 452. Of the total number of petitions received during the year 1898, 41 are from towns, 4 from cities and 7 from counties, the roads petitioned for being located in 5 cities and 42 towns.

Following the suggestion made by the commission in the last annual report, that part of the statute relating to petitions, which required that with each petition must be submitted plans and profiles of the road, was repealed, and the cost of petitioning is now practically nothing. The cost of preparing such plans and profiles was an obstacle to the freedom of petition, many towns being unwilling to spend from \$50 to \$150 in petitioning for what they could have no assurance of getting. It was with the view of securing more numerous petitions that the repeal of that provision of the law was recommended. Under the provisions of the statute, the commission cannot undertake the building of a State highway unless it is regularly petitioned for by the proper authorities. It is restricted in its selection, therefore, if the number of petitions be not large, and its general scheme of State road distribution must be more or less determined by the lack of petitions. Only the utmost freedom of selection will secure the wisest deter-



mination of such a general scheme, and it is greatly desired that petitioning will be more frequent in the future than in the past. There should always be, of course, some reasonable ground on which to base a request that a road should be taken as a State highway; but in many towns alternative routes exist, all deserving of consideration, and some one more likely than the others to fit into a general scheme. In such cases the commission should have the opportunity of choice.

#### LEGISLATION.

The commission renews its recommendation of a year ago in regard to grade crossings. The Commonwealth has a vital interest in this matter whenever a grade crossing exists on a State highway; and it is suggested that whenever counties, cities or towns petition for the abolition of such crossings on lines of State highways, the State Highway Commission should be authorized to appear before the court as one of the parties interested, and to offer such contributions to the cost of the improvement as may be deemed just.

In the last annual report it was suggested that legislation should be had providing for taxing the counties, cities and towns in which State roads are built with the cost of maintaining them, either in whole or in part, and in such proportions as may be deemed equitable. There are two very good reasons for this suggestion, to which the commission again invites the attention of the Legislature. First, there is real and considerable *local* benefit accruing to the town through which the road passes, although under existing law it contributes toward construction and maintenance no more than every other town in the Commonwealth; second, a local incentive to care for and properly treat a State highway will greatly diminish the annual cost of maintenance.

It would greatly facilitate the construction of State highways if the time allowed municipal authorities in which to consider the taking of a contract offered by the State were reduced from thirty days to ten days. On a large number of contracts this would make available twenty days in the very best part of the season, and the commission sees no reason why ten days may not suffice for this purpose as well as thirty.

The Acts of 1898, chapter 578, in regard to street railways, which went into effect Oct. 1, 1898, modified very radically the relation hitherto existing between these corporations and the Highway Commission. In some degree the changes were along the line of the suggestions of this commission in its last annual report; but on the whole the result is somewhat confusing, and only experience, possibly supplemented by an appeal to the courts, will furnish anything like a satisfactory interpretation of the law. It is hoped that the latter expedient may not become necessary; and the commission, in its first dealings with street railways under this act, is endeavoring to be just and fair, and as liberal as is compatible with the necessary conservation of the interests of the Commonwealth. In the report of a year ago occurs the following:—

The commission fully appreciates the fact that the highway, being for the free and unrestricted use of all, is of paramount importance, and that the entire location which it occupies must be available for its construction and maintenance, everything else therein existing by sufferance and for the accommodation of the public. It further recognizes the fact that franchises held by street railway corporations are generally valuable, being necessarily in the nature of monopolies; and that for this reason they may well be required to bear, themselves, all expenses incident to their existence. But it is also true that they serve the convenience of the public, that they are demanded by the exigencies of modern life, and that certain public concessions are necessary to their successful administration.

To this it may be added that, in interpreting the new law, it is recognized that a street railway established upon certain lines and grades by the authority and with the approval of town authorities has acquired certain rights that the Commonwealth cannot justly ignore; and that when, in the construction of a State highway, it becomes necessary to change said lines and grades, the State may properly bear a fair share of the cost of so doing.

The commission believes that the control of and responsibility for the road machinery purchased under the provisions of chapter 573, Acts of 1896, and section 3, chapter 355, of the Acts of 1897, are yet far from satisfactory. Many steam

rollers stand idle during a good part of the year, and many towns needing steam rollers are unable to obtain them, owing to a *quasi* claim maintained by the town making the request for purchase. It is believed that a much wider field of usefulness for this machinery would be secured by following the suggestion made a year ago in reference to this matter.

It occasionally happens that a contractor fails to pay for materials furnished or work performed in the construction of a State highway. At present there seems to be no legal process by which the creditor can establish a claim upon any money due the contractor from the Commonwealth. The general, although erroneous, impression that all work done on State roads is done directly by the commission or through its responsible agents, leads to an extension of credit to those engaged beyond what would be granted to private citizens. In this way innocent parties have suffered through the failure of the contractor to make payment, and it is believed that some legislation for the better protection of those supplying labor or material should be provided.

#### COUNTY ASSESSMENTS.

In accordance with the provisions of the statute, the commission has certified to the Auditor of the State the several amounts to be repaid to the Commonwealth by the counties in which State roads have been built, being one-quarter of the amount expended in each county during the year. The repayments are to be made, as determined upon last year, at the end of six years from the date of the assessment, or at an earlier date if the counties so desire. The amount thus assessed during this year is \$123,835.65.

#### THE DISTRIBUTION OF STATE ROADS.

Notwithstanding the fact that a full exhibit of the policy of the commission in the matter of the selection of roads to be taken as State highways was printed in the report for 1896 and again in that for 1897, there is still much misunderstanding about it, and the principles by which the commission is guided seem not to be very generally understood. There are many who apparently fail to understand the reasons which in-

fluenced the commission in determining that a proper interpretation of the statute required it to apportion the expenditure among the several counties in proportion to the road mileage of these counties.

These reasons were gone into more thoroughly than before in a letter of the commission to his Excellency the Governor, dated June 1, 1897, which was printed in the annual report of last year. This report is now out of print, and copies are very difficult to obtain. In view of the importance of both the papers, as expressing the views of the commission on one of the most difficult subjects with which it has to deal, they have been again printed together in Appendix F.

#### AID TO MUNICIPALITIES.

Several towns have been given engineering advice which enabled them to build the same high type of road as has been built by the State. In some cases the specifications have been prepared and the building supervised by the engineers of the commission.

Advice has also been given to town officials as to road machinery, materials and methods; and it is to be noted that since the organization of the Highway Commission thirty different municipalities have purchased machinery and for the first time built broken-stone roads. In the building of these town roads the greatest care has been taken by the town officials to secure good drainage, to use the best materials and to place the broken stone in the most approved manner.

We are credibly informed that without the educating influence of a State road in the immediate vicinity it would have been practically impossible to have secured the necessary town appropriations for building such roads.

The people of the Commonwealth are gradually accepting the theory that it is a matter of both convenience and economy to have properly built roads; and it is fair to predict that the improvement of the town roads will be yet more marked as the State road system progresses.

With the improvement of the main roads comes a desire for information which will guide the town officials in bettering the less important town roads in a less costly manner than that



adopted by the Commonwealth. The commission, believing that lighter grades and good drainage, without a surfacing of either broken stone or gravel, will greatly improve roads of light traffic, has advised the officials of a few of the towns to this effect, with satisfactory results, both as to the resulting roads and the cost of the same.

#### GRAVEL ROADS.

There has been much discussion during the past few years as to the advisability of a more extensive construction of gravel roads, it being assumed by some that this would make it possible to build more miles of road with the amount of money annually appropriated for the State highway work. There has been little complaint as to the excellence of the roads already built; but it has been contended that a more general use of gravel for surfacing would so lessen the cost that a very much greater number of miles could be built, and in this way many localities might be relieved of the cost of caring for their roads.

With the number of miles of road to be maintained in the State, and the amount of money annually appropriated, it is impossible to build macadam roads in all localities, and no one believes that such a course would be wise. In the construction of a *good* road with any surfacing material, there must always be a large amount of grading, drainage, both surface and underground, bridge work, including culverts, guard rail, etc., the cost of which will be a large share of the whole, and will not be affected by the character of surface material.

There are some places in the State where good gravel is obtainable at a comparatively small expense, and there is no doubt but in such towns gravel roads could be built for less money than it would be possible to build macadam roads for; but there are other cases where it would be quite as expensive to build a gravel road as it would be to build one of macadam.

Nor can there be any doubt that a macadam road, once properly built, is the cheapest road in the end, on account of the small expense for annual maintenance. Owing to the varying conditions in different parts of the State, the commission

determined that a careful study must be made of each individual case before it can be decided what kind of a road should be built, and that consideration must be given to the amount and character of traffic to which the road is subjected. In some cases the commission has built gravel roads which have turned out very satisfactorily. How far this can be carried is a question which can better be decided by a few years' experience; but the commission wishes to be understood as distinctly favoring the use of gravel or other less expensive road material whenever the local conditions are such as to justify it in so doing. In determining this, however, it is necessary to keep in view the fact that the final and continued cost of the system will be measured by the cost of maintenance, and also the fact that the public highways are sure to be used by a much larger number of people in the future than in the past.

It is probable that good gravel can be obtained in some of the towns which have heretofore been thought to possess none that could be used for road building; and experiments are already under way to ascertain if materials can be mixed in such a way as to give satisfactory results.

A careful study of the various conditions is necessary in road building. The same conditions do not exist in the sands of Cape Cod and the clayey, hard soil of the western part of the State. Individual consideration is necessary in all cases.

#### ROAD CONSTRUCTION IN NEW JERSEY.

During the week ending April 23, 1898, one of the commissioners, Mr. McClintock, visited and examined certain roads built in New Jersey under the State aid act. Through the courtesy of the State road commissioner, Hon. Henry I. Budd, every opportunity was given to see the different types of road which have been built and to study the methods used in their building.

The roads visited were built either of trap rock or gravel, and were in excellent condition. Telfording was used over a clay subsoil, and side drains were built where ground water stood near the surface.

The widths of the roadways vary from 9 to 16 feet, by far the larger number being 12 or 10 feet wide.

The depth of the broken stone varies from 4 to 12 inches ; on most of the roads it is 8 inches. Telford roads are built with 8 or 12 inches of stone, most of them being 8 inches.

In the telford roads 5 inches are of hand-laid ledge stone, with a covering of 3 inches of broken stone. No gravel is placed under the telfording. The telfording is not rolled with a heavy roller before the broken stone is placed. Clay is often used on the telfording and also on the broken stone. Some of the roads are built by using a steam roller and some by the use of a horse roller.

The side drains are built without any stone or gravel, the back-filling being made with the material excavated from the pipe trench.

Most of the roads examined traversed a fairly level country, requiring but little excavation to give an easy grade, and the cost of grading on the average road is very small. A greater part of what little grading has been done is in material that can be moved cheaply, as it shovels easily, without picking, and is hauled short distances only. In the few cases where much grading was done, the cost averaged about the same as on Massachusetts roads.

All work is done by contract after advertisement. The contract requires payment on a basis of square yard measurement of roadway built, and this price covers the cost of shaping and finishing, and in general all other work required of the contractor except grading. The grading is done at a stipulated price per cubic yard.

Information as to the actual cost to the contractor and of the quantities of materials used are hard to get, on account of the system of contracting. The State does not have it, and the contractor will not or cannot furnish it. However, it was ascertained that labor is paid \$1.25 and double teams with cart and driver \$3 per day of 10 hours. Trap rock is delivered by rail, at a maximum cost of \$1.15 per ton on the cars at its point of destination.

The cost of hauling rock over the roads already improved is fairly low. The steam railroad system is such that the average haul over the highway is short. These different items of cost being low, makes it possible to place the stone on the roads at

an average price considerably below \$2 per ton, possibly not more than \$1.60.

As has already been said, most of the roads nominally have a depth of stone equal to 8 inches. It was stated that 9 inches of broken stone rolls to 8 inches. A mile of road, 15 feet wide, on this basis, requires about 2,933 tons of broken stone, estimating a cubic yard to weigh  $1\frac{1}{2}$  tons. At \$1.60 per ton, the cost of 2,933 tons of stone is \$4,693. The one contractor met with, and at work, gave the amount of broken stone used on a given length and width, which showed that that particular road used stone at the rate of 3,000 tons per mile of road 15 feet wide. These figures practically agree with those obtained in the Massachusetts work on a road 6 inches thick after rolling.

In the New Jersey work, the stone is spread to a depth of 9 inches, which is assumed to give a depth of 8 inches after rolling; while in the Massachusetts work the stone is laid on to arbitrary grades, and an absolute depth of 6 inches is maintained.

In the New Jersey work the contract is for a stipulated price per square yard; while in the Massachusetts work all the broken stone is weighed, and the contractor is paid for each ton placed on the road.

By referring to the above method of spreading stone on the New Jersey roads, it seems a simple matter to estimate the number of tons of stone required on any road, and this is about 3,000. On the other hand, by maintaining the top surface of the stone to an arbitrary grade, much loss is met with by stone being pressed downward into the subgrade, and the average number of tons of stone per width of 15 feet road is considerably increased.

The price of labor in Massachusetts is \$1.50 a day of nine hours, and of a double team and driver \$4 per day of nine hours. By comparing the price of labor and team hire and length of day, it will be noted that the prices paid in Massachusetts are higher than in New Jersey by 20 per cent. on labor,  $33\frac{1}{3}$  per cent. on teams, and about 11 per cent. on the length of the day.

The figures already given indicate that in New Jersey a mile of broken-stone road, 15 feet wide, costs about \$4,700. A



study of the Massachusetts State roads indicates that a mile of broken-stone road, 15 feet wide, costs about \$5,700. With a nine-hour day, the cost of the New Jersey work would be increased 11 per cent., and be \$5,217 per mile. A still further increase would be made on account of the price of labor and teams. The hours of labor in Massachusetts are fixed by legislative act. The price per day for labor and teams is fixed by custom, and it would seem that the increased cost of Massachusetts roads due to these two causes cannot well be prevented.

In the matter of the greater number of tons of broken stone per mile of Massachusetts roads, as compared with the New Jersey road, it may be said that the number of tons of stone per mile of Massachusetts road has been gradually reduced, until the average for the last year's roads is not much greater than it is in New Jersey.

One point of interest in connection with the New Jersey roads is that all the bridges, culverts and fences are built by the county. In some of the counties the rough grading is done by the county, so that the road built by the State does not include much more than the broken-stone surfacing. More or less work has also been done by private subscription.

Thus far in this report comparison has been made between roads 1 mile long and 15 feet wide. Reference has already been made to the fact that the roads in New Jersey are generally 10 or 12 feet wide. Wherever these narrow roads have been built they have given general satisfaction, and there is no reason to suppose that they would not be equally satisfactory in Massachusetts on all except heavily travelled roads. The saving in cost, by narrowing from a 15-foot roadway, would be about \$1,140 per mile if reduced to 12 feet, and \$1,900 if reduced to 10 feet.

Many miles of excellent gravel roads have been built in New Jersey at a cost considerably below the figures given above. Much of the gravel used was found near the road; some of it was taken from hills on the road; none of it required special treatment, and the average haul was short. The so-called gravel, which gave the best results, was made up of grit or pebbles 50 per cent., sand 30 per cent., and clay 20 per cent. This was placed on the road to a depth of 8 inches, in two

courses, and thoroughly harrowed and rolled. These gravel roads are reported to wear well, and to cost but little for maintenance.

Except within limited areas, natural gravel such as has been described cannot be found in Massachusetts; but it is believed that there are many localities where eventually the same results may be obtained by a mixture of stone, sand and clay, but at a greatly increased cost. Such roads, however can only satisfy the demand where the travel is comparatively light.

It is interesting to note that the use of the clay binder on the New Jersey roads does not prevent the ravelling out of the surface stone.

#### ENGINEERING.

The engineering department was organized with Mr. Charles Mills in charge of all engineering and construction work, with Mr. J. C. S. Taber as first assistant engineer in charge of surveying parties and office work, Mr. A. M. Lovis as second assistant engineer and Mr. A. N. Johnson as third assistant engineer.

Messrs. W. B. Wheeler, F. C. Pillsbury, W. R. Farrington, J. A. Johnston and F. H. Joyner have been employed as division engineers. Messrs. E. J. Nichols, H. R. Starbird and B. H. Davis have been employed as chiefs of survey parties, with E. N. Colburn, A. B. Farnham, W. T. Howe, H. D. Phillips, W. S. Andrews, H. H. Bachelder, W. A. Grover and N. B. Wilber as transitmen, and F. C. Ayers, M. L. Brown, Jr., J. J. Gleason, L. I. Hewes, G. A. Kingsbury, H. S. Lancaster, J. P. Locke, L. Loring, L. J. Proctor, C. A. Record, W. S. Rhodes and R. E. Wilder as rodmen. Messrs. A. H. Blevins, W. G. Burns, W. W. Chase, D. M. Hudson, J. F. Osborn, H. V. Sandford, J. H. Taylor, A. Larrabee and J. A. Woodworth have been employed in the draughting room. Mr. E. J. O'Hara has been employed as stenographer to the chief engineer.

For list of resident engineers employed during the year 1898, see Appendix E.

## ESTIMATES FOR 1899.

As already stated, the commission has recommended an appropriation of \$500,000 for the current year, \$100,000 of which shall be available for expenditure only after Jan. 1, 1900. Experience has shown that an annual appropriation of this sum, divided in this way, would make an efficient and economical scheme of construction that would gradually extend the great system of State highways, now in its formation stage, towards its final limit without excessive taxation at any period. As one-quarter is annually returned by the counties, the above estimate of expenditure means a draft upon the Commonwealth of \$375,000.

At this time more than 200 miles of State highway are completed and in use. They are so distributed over the Commonwealth that nearly every community enjoys their advantages and has had an opportunity to judge of their quality. They have received unstinted praise from the best authorities in other parts of the country, and the State of Massachusetts is everywhere regarded as the leader in the important work of public road improvement, in which the whole country has been so much interested during the past few years.

## REPORT OF THE GEOLOGIST.

During the past year considerable improvement has been made in the facilities for testing road material, and many interesting examinations and tests have been made by Mr. Page, the geologist employed by the commission. In Appendix D will be found a full report of the work done, with a description of the methods of making tests and the machinery employed.

The results of this work are of permanent and increasing value. The commission is frequently called upon to make tests of road material, and it is usually able to comply with those that come from municipal authorities, or State and county officials outside of Massachusetts.

## ANNUAL REPORTS.

It is earnestly recommended that a larger number of the annual reports of the commission be printed. In 1897 an extra

edition of 2,000 was printed by order of the Legislature, and these were hardly sufficient to supply the demand. Of the last report no copies are now available, as far as the commission is aware, and it has been compelled to decline requests for copies of this and previous reports from many officials, libraries and individuals in all parts of the country.

## EXPENDITURES.

The following is a summary of the expenditures of the Highway Commission during the year 1898. Although the statement shows a considerable amount of money unexpended at this date, it is the least amount needed to complete contracts already made.

## CONSTRUCTION EXPENDITURES.

| TOWN OR CITY.                            | Year of Lay-out. | Amount.    | Totals.     |
|--|------------------|------------|-------------|
| <i>Barnstable County.</i>                |                  |            |             |
| Barnstable, . . . . .                    | 1897             | \$6,112 92 |             |
| Bourne, . . . . .                        | 1897             | 67 24      |             |
| Bourne, . . . . .                        | 1898             | 4,604 30   |             |
| Brewster, . . . . .                      | 1897*            | 7 53       |             |
| Dennis, . . . . .                        | 1895             | 31 80      |             |
| Dennis, . . . . .                        | 1897             | 206 93     |             |
| Dennis, . . . . .                        | 1898             | 10,954 27  |             |
| Sandwich, . . . . .                      | 1897             | 32 71      |             |
| Sandwich, . . . . .                      | 1898             | 2,006 19   |             |
| Truro, . . . . .                         | 1895             | 588 32     |             |
| Truro, . . . . .                         | 1895             | 2,168 67   |             |
| Yarmouth (South), . . . . .              | 1897             | 3,835 06   |             |
| Yarmouth (Bridge), . . . . .             | 1896             | 273 44     |             |
|  |                  |            | \$30,889 38 |
| <i>Berkshire County.</i>                 |                  |            |             |
| Adams, . . . . .                         | 1897             | \$2,293 04 |             |
| Dalton, . . . . .                        | 1896             | 14 67      |             |
| Great Barrington, . . . . .              | 1897             | 14,138 57  |             |
| Hancock, . . . . .                       | 1895             | 523 57     |             |
| Hancock, . . . . .                       | 1896             | 21 54      |             |
| Hancock, . . . . .                       | 1898             | 4,137 21   |             |
| Pittsfield, . . . . .                    | 1897             | 1,252 22   |             |
| Pittsfield, . . . . .                    | 1898             | 7,979 82   |             |
| Richmond, . . . . .                      | 1897             | 1,241 42   |             |
| Richmond, . . . . .                      | 1898             | 3,917 12   |             |
| Williamstown, . . . . .                  | 1896             | 16 96      |             |
| Williamstown, . . . . .                  | 1898             | 7,966 04   |             |
| Windsor, . . . . .                       | 1897             | 5,017 62   |             |
|  |                  |            | 48,519 80   |
| <i>Amount carried forward,</i> . . . . . |                  |            | \$79,409 18 |

\* First.



CONSTRUCTION EXPENDITURES — *Continued.*

| TOWN OR CITY.                   | Year of<br>Lay-out. | Amount.    | Totals.      |
|---------------------------------|---------------------|------------|--------------|
| <i>Amount brought forward,</i>  |                     |            | \$79,409 18  |
| <i>Bristol County.</i>          |                     |            |              |
| Acushnet, . . . . .             | 1897                | \$6 19     |              |
| North Attleborough, . . . . .   | 1896                | 453 79     |              |
| North Attleborough, . . . . .   | 1897                | 2,119 83   |              |
| Rehoboth, . . . . .             | 1896                | 108 71     |              |
| Somerset, . . . . .             | 1897                | 34 03      |              |
| Taunton, . . . . .              | 1898                | 3,750 76   |              |
| Westport, . . . . .             | 1896                | 50 39      |              |
| Westport, . . . . .             | 1898                | 7,818 13   |              |
|                                 |                     |            | 14,341 83    |
| <i>Dukes County.</i>            |                     |            |              |
| Edgartown, . . . . .            | 1897                | \$305 08   |              |
| West Tisbury, . . . . .         | 1896                | 248 91     |              |
| West Tisbury, . . . . .         | 1897                | 172 46     |              |
|                                 |                     |            | 726 45       |
| <i>Essex County.</i>            |                     |            |              |
| Andover, . . . . .              | 1897                | \$675 26   |              |
| Beverly, . . . . .              | 1897                | 710 70     |              |
| Beverly, . . . . .              | 1898                | 5,748 68   |              |
| Gloucester, . . . . .           | 1898                | 11,470 37  |              |
| Merrimac, . . . . .             | 1897                | 1,047 84   |              |
| Merrimac, . . . . .             | 1898                | 81 88      |              |
| Newburyport, . . . . .          | 1898                | 2,607 38   |              |
| Swampscott, . . . . .           | 1897                | 12,162 65  |              |
| Wenham, . . . . .               | 1897                | 348 29     |              |
| West Newbury, . . . . .         | 1897                | 629 28     |              |
|                                 |                     |            | 35,482 33    |
| <i>Franklin County.</i>         |                     |            |              |
| Ashfield, . . . . .             | 1897                | \$9,319 30 |              |
| Ashfield, . . . . .             | 1898*               | 10,226 94  |              |
| Ashfield, . . . . .             | 1898†               | 4,895 55   |              |
| Ashfield (Bridge), . . . . .    | 1898                | 16 18      |              |
| Buckland, . . . . .             | 1898                | 4,975 02   |              |
| Charlemont, . . . . .           | 1897                | 204 49     |              |
| Charlemont, . . . . .           | 1898                | 3,324 62   |              |
| Charlemont (Bridge), . . . . .  | 1898                | 14 00      |              |
| Colrain, . . . . .              | 1898                | 3,038 11   |              |
| Deerfield, . . . . .            | 1895                | 223 23     |              |
| Erving, . . . . .               | 1898                | 709 12     |              |
| Montague, . . . . .             | 1898                | 8,083 20   |              |
| Sunderland, . . . . .           | 1897                | 235 06     |              |
|                                 |                     |            | 45,264 82    |
| <i>Hampden County.</i>          |                     |            |              |
| Brimfield, . . . . .            | 1897                | \$3,785 12 |              |
| Chicopee, . . . . .             | 1898                | 524 48     |              |
| Russell (Fairfield), . . . . .  | 1896                | 71 59      |              |
| Russell, . . . . .              | 1897                | 1,414 38   |              |
| <i>Amounts carried forward,</i> |                     | \$5,795 57 | \$175,224 61 |

\* First.

† Second.

CONSTRUCTION EXPENDITURES— *Continued.*

| TOWN OR CITY.                         | Year of Lay-out. | Amount.    | Totals.      |
|---------------------------------------|------------------|------------|--------------|
| <i>Amounts brought forward, . . .</i> |                  | \$5,795 57 | \$175,224 61 |
| Russell, . . . . .                    | 1898*            | 3,616 96   |              |
| Russell, . . . . .                    | 1898†            | 1,588 97   |              |
| Westfield, . . . . .                  | 1898*            | 1,982 39   |              |
| Westfield, . . . . .                  | 1898†            | 1,751 41   |              |
| Wilbraham, . . . . .                  | 1897             | 8 15       | 14,743 45    |
| <i>Hampshire County.</i>              |                  |            |              |
| Hadley, . . . . .                     | 1898             | \$5,186 15 |              |
| Huntington, . . . . .                 | 1896             | 32 82      |              |
| Northampton, . . . . .                | 1897             | 47 88      |              |
| Northampton, . . . . .                | 1898             | 3,237 39   |              |
| South Hadley, . . . . .               | 1898             | 4,147 08   |              |
| Ware, . . . . .                       | 1897             | 2,568 10   |              |
| Williamsburg, . . . . .               | 1896             | 16 14      |              |
| Williamsburg, . . . . .               | 1898             | 7,978 75   | 23,214 31    |
| <i>Middlesex County.</i>              |                  |            |              |
| Ashby, . . . . .                      | 1896             | \$1 08     |              |
| Ashby, . . . . .                      | 1898             | 4,052 89   |              |
| Bedford, . . . . .                    | 1897             | 1,317 23   |              |
| Boxborough, . . . . .                 | 1897             | 369 90     |              |
| Chelmsford, . . . . .                 | 1898             | 16 64      |              |
| Concord, . . . . .                    | 1897             | 431 57     |              |
| Concord, . . . . .                    | 1898             | 5,983 81   |              |
| Lexington, . . . . .                  | 1898             | 14,874 86  |              |
| Lincoln, . . . . .                    | 1897             | 146 92     |              |
| Lowell (North), . . . . .             | 1897             | 3 49       |              |
| Lowell (South), . . . . .             | 1897             | 486 74     |              |
| Lowell (South), . . . . .             | 1898             | 6,072 07   |              |
| Marlborough (West), . . . . .         | 1897             | 6,448 51   |              |
| Marlborough (East), . . . . .         | 1897             | 3,146 09   |              |
| North Reading, . . . . .              | 1897             | 533 62     |              |
| North Reading, . . . . .              | 1898             | 15 22      |              |
| Stoneham, . . . . .                   | 1897-98          | 5,258 64   |              |
| Sudbury, . . . . .                    | 1897             | 1,446 80   |              |
| Sudbury, . . . . .                    | 1898             | 538 11     |              |
| Townsend, . . . . .                   | 1898             | 839 62     |              |
| Wayland, . . . . .                    | 1897             | 5,228 32   | 57,212 13    |
| <i>Norfolk County.</i>                |                  |            |              |
| Cohasset, . . . . .                   | 1897             | \$664 82   |              |
| Holbrook, . . . . .                   | 1894             | 2,254 97   |              |
| Holbrook, . . . . .                   | 1896             | 2,963 45   |              |
| Norfolk, . . . . .                    | 1895             | 319 43     |              |
| Norwood, . . . . .                    | 1897             | 472 89     |              |
| Quincy, . . . . .                     | —                | 102 73     |              |
| Walpole (North), . . . . .            | 1897             | 779 72     |              |
| <i>Amounts carried forward, . . .</i> |                  | \$7,558 01 | \$270,394 50 |

\* First.

† Second.

CONSTRUCTION EXPENDITURES — *Continued.*

| TOWN OR CITY.                             | Year of Lay-out. | Amount.     | Totals.      |
|---|------------------|-------------|--------------|
| <i>Amounts brought forward,</i> . . . . . | . . . . .        | \$7,558 01  | \$270,394 50 |
| Walpole (North), . . . . .                | 1898             | 2,475 90    |              |
| Weymouth, . . . . .                       | 1894             | 1,175 39    |              |
| Weymouth, . . . . .                       | 1896             | 86 73       |              |
| Weymouth, . . . . .                       | 1897             | 2,069 37    |              |
| Wrentham, . . . . .                       | 1897             | 259 40      |              |
| Wrentham, . . . . .                       | 1898             | 6,558 49    |              |
|   |                  |             | 20,183 29    |
| <i>Nantucket County.</i>                  |                  |             |              |
| Nantucket, . . . . .                      | 1895*            | \$321 52    |              |
| Nantucket, . . . . .                      | 1896*            | 13 15       |              |
| Nantucket, . . . . .                      | 1897             | 5,887 31    |              |
|   |                  |             | 6,221 98     |
| <i>Plymouth County.</i>                   |                  |             |              |
| Brockton, . . . . .                       | 1897             | \$768 82    |              |
| Brockton, . . . . .                       | 1898             | 3,338 14    |              |
| Duxbury, . . . . .                        | 1897             | 212 37      |              |
| Hingham, . . . . .                        | 1897             | 95 87       |              |
| Marion, . . . . .                         | 1895             | 259 23      |              |
| Marshfield, . . . . .                     | 1898             | 2,904 29    |              |
| Mattapoisett, . . . . .                   | 1895             | 7 83        |              |
| Middleborough, . . . . .                  | 1897             | 268 71      |              |
| Middleborough, . . . . .                  | 1898             | 3,027 97    |              |
| Plymouth, . . . . .                       | 1897-98          | 2,446 28    |              |
| Plymouth, . . . . .                       | 1896             | 4,651 82    |              |
| Scituate, . . . . .                       | 1894             | 121 15      |              |
| Wareham, . . . . .                        | 1898             | 8,181 07    |              |
| Whitman, . . . . .                        | 1895             | 9 24        |              |
| Whitman, . . . . .                        | 1896             | 13 81       |              |
|   |                  |             | 26,306 60    |
| <i>Suffolk County.</i>                    |                  |             |              |
| Revere, . . . . .                         | 1897             | \$10,221 80 |              |
| Revere, . . . . .                         | 1897-98          | 32,696 54   |              |
|   |                  |             | 42,918 34    |
| <i>Worcester County.</i>                  |                  |             |              |
| Auburn, . . . . .                         | 1896             | \$12 77     |              |
| Auburn, . . . . .                         | 1898             | 3,998 58    |              |
| Barre, . . . . .                          | 1897             | 201 57      |              |
| Brookfield, . . . . .                     | 1897             | 2,891 35    |              |
| Brookfield, . . . . .                     | 1898             | 2,607 83    |              |
| Fitchburg, . . . . .                      | 1897             | 5,686 14    |              |
| Gardner, . . . . .                        | 1898             | 9,425 87    |              |
| Grafton, . . . . .                        | 1897             | 9 25        |              |
| Hardwick, . . . . .                       | 1897             | 1,382 71    |              |
| Holden, . . . . .                         | 1897             | 112 84      |              |
| Holden, . . . . .                         | 1898             | 5,423 09    |              |
| Leicester, . . . . .                      | 1896             | 556 85      |              |
| Leicester, . . . . .                      | 1898             | 17,119 89   |              |
| <i>Amounts carried forward,</i> . . . . . | . . . . .        | \$49,428 74 | \$366,024 71 |

\* Second.

CONSTRUCTION EXPENDITURES—*Concluded.*

| TOWN OR CITY.                             | Year of<br>Lay-out. | Amount.     | Totals.      |
|---|---------------------|-------------|--------------|
| <i>Amounts brought forward,</i> . . . . . |                     | \$49,428 74 | \$366,024 71 |
| Lunenburg, . . . . .                      | 1898                | 4,192 09    |              |
| New Braintree, . . . . .                  | 1897                | 2,807 34    |              |
| Northborough, . . . . .                   | 1897                | 4,170 63    |              |
| Northborough, . . . . .                   | 1898                | 1,134 31    |              |
| Paxton, . . . . .                         | 1895*               | 4 89        |              |
| Paxton, . . . . .                         | 1895†               | 13 05       |              |
| Paxton, . . . . .                         | 1897                | 12 94       |              |
| Paxton, . . . . .                         | 1898                | 5,519 15    |              |
| Phillipston, . . . . .                    | 1897                | 5,163 66    |              |
| Phillipston, . . . . .                    | 1898                | 5,264 60    |              |
| Princeton, . . . . .                      | 1897                | 129 15      |              |
| Shrewsbury, . . . . .                     | 1895                | 32 63       |              |
| Shrewsbury, . . . . .                     | 1896                | 18 92       |              |
| Shrewsbury, . . . . .                     | 1897                | 39 08       |              |
| Shrewsbury, . . . . .                     | 1898                | 6,104 71    |              |
| Sterling, . . . . .                       | 1897                | 221 12      |              |
| Sterling, . . . . .                       | 1898                | 4,944 11    |              |
| Sturbridge, . . . . .                     | 1897                | 5,302 33    |              |
| Uxbridge, . . . . .                       | 1897                | 1,571 14    |              |
| Uxbridge, . . . . .                       | 1898                | 3,842 61    |              |
| Warren, . . . . .                         | 1898                | 3,986 47    |              |
| Westborough, . . . . .                    | 1897                | 5,899 72    |              |
| West Boylston, . . . . .                  | 1897                | 7,039 48    |              |
| West Boylston, . . . . .                  | 1898                | 4,078 90    |              |
| Westminster, . . . . .                    | 1895                | 136 79      |              |
| Westminster, . . . . .                    | 1896                | 207 90      |              |
| Westminster, . . . . .                    | 1897                | 320 15      |              |
| Westminster, . . . . .                    | 1898                | 3,436 68    |              |
| Worcester (Paxton), . . . . .             | 1896                | 92 21       |              |
| Worcester (Holden), . . . . .             | 1897                | 8,642 66    |              |
|   |                     |             | 133,758 16   |
| Total, . . . . .                          |                     |             | \$499,782 87 |

\* First.

† Second.

## REPAIR AND MAINTENANCE EXPENDITURES.

| TOWN OR CITY.                            | Amount.  | Totals. |
|--|----------|---------|
| <i>Barnstable County.</i>                |          |         |
| Barnstable, . . . . .                    | \$57 05  |         |
| Brewster, . . . . .                      | 500 88   |         |
| Bourne, . . . . .                        | 93 92    |         |
| <i>Amount carried forward,</i> . . . . . | \$651 85 |         |

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

| TOWN OR CITY.                            | Amount.  | Totals.    |
|--|----------|------------|
| <i>Amount brought forward, . . . . .</i> | \$651 85 |            |
| Dennis, . . . . .                        | 568 13   |            |
| Sandwich, . . . . .                      | 317 24   |            |
| Truro, . . . . .                         | 14 86    |            |
| Yarmouth (North), . . . . .              | 340 45   |            |
| Yarmouth (South), . . . . .              | 280 52   | \$2,173 05 |
| <i>Berkshire County.</i>                 |          |            |
| Adams, . . . . .                         | \$7 63   |            |
| Dalton, . . . . .                        | 519 45   |            |
| Great Barrington, . . . . .              | 382 36   |            |
| Hancock, . . . . .                       | 722 89   |            |
| Lee, . . . . .                           | 418 83   |            |
| North Adams, . . . . .                   | 309 87   |            |
| Pittsfield, . . . . .                    | 228 03   |            |
| Richmond, . . . . .                      | 52 77    |            |
| Williamstown, . . . . .                  | 148 09   |            |
| Windsor, . . . . .                       | 1 79     | 2,791 71   |
| <i>Bristol County.</i>                   |          |            |
| Acushnet, . . . . .                      | \$41 44  |            |
| Fairhaven, . . . . .                     | 97 45    |            |
| North Attleborough, . . . . .            | 203 82   |            |
| Rehoboth, . . . . .                      | 74 56    |            |
| Somerset, . . . . .                      | 108 24   |            |
| Taunton, . . . . .                       | 145 73   |            |
| Westport, . . . . .                      | 132 45   | 803 69     |
| <i>Dukes County.</i>                     |          |            |
| Cottage City, . . . . .                  | \$682 73 |            |
| Edgartown, . . . . .                     | 19 03    |            |
| Tisbury, . . . . .                       | 225 10   |            |
| West Tisbury, . . . . .                  | 123 11   | 1,049 97   |
| <i>Essex County.</i>                     |          |            |
| Andover, . . . . .                       | \$46 16  |            |
| Beverly, . . . . .                       | 182 32   |            |
| Gloucester, . . . . .                    | 137 13   |            |
| Lawrence, . . . . .                      | 9 65     |            |
| Methuen, . . . . .                       | 44 59    |            |
| Merrimac, . . . . .                      | 3 52     |            |
| Newburyport, . . . . .                   | 43 34    |            |
| Swampscott, . . . . .                    | 6 48     |            |
| Wenham, . . . . .                        | 27 68    |            |
| West Newbury, . . . . .                  | 460 95   | 961 82     |
| <i>Amount carried forward, . . . . .</i> |          | \$7,780 24 |

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

| TOWN OR CITY.                             | Amount.          | Totals.            |
|---|------------------|--------------------|
| <i>Amount brought forward, . . . . .</i>  | <i>. . . . .</i> | \$7,780 24         |
| <i>Franklin County.</i>                   |                  |                    |
| Ashfield, . . . . .                       | \$4 65           |                    |
| Rockland, . . . . .                       | 21 99            |                    |
| Charlemont, . . . . .                     | 51 90            |                    |
| Deerfield, . . . . .                      | 73 72            |                    |
| Orange, . . . . .                         | 74 47            |                    |
| Shelburne, . . . . .                      | 286 13           |                    |
| Sunderland, . . . . .                     | 1 18             |                    |
|   |                  | 514 04             |
| <i>Hampden County.</i>                    |                  |                    |
| Brimfield, . . . . .                      | \$7 33           |                    |
| Monson, . . . . .                         | 196 43           |                    |
| Russell, . . . . .                        | 190 96           |                    |
| Westfield, . . . . .                      | 55 37            |                    |
| West Springfield, . . . . .               | 198 84           |                    |
| Wilbraham, . . . . .                      | 337 18           |                    |
|   |                  | 986 11             |
| <i>Hampshire County.</i>                  |                  |                    |
| Easthampton, . . . . .                    | \$171 89         |                    |
| Goshen, . . . . .                         | 628 88           |                    |
| Granby, . . . . .                         | 19 62            |                    |
| Hadley, . . . . .                         | 315 19           |                    |
| Huntington, . . . . .                     | 24 07            |                    |
| Northampton, . . . . .                    | 77 19            |                    |
| South Hadley, . . . . .                   | 181 97           |                    |
| Williamsburg, . . . . .                   | 58 97            |                    |
| Ware, . . . . .                           | 6 33             |                    |
|   |                  | 1,484 11           |
| <i>Middlesex County.</i>                  |                  |                    |
| Ashby, . . . . .                          | \$163 79         |                    |
| Bedford, . . . . .                        | 7 61             |                    |
| Boxborough, . . . . .                     | 4 29             |                    |
| Concord, . . . . .                        | 7 55             |                    |
| Lexington, . . . . .                      | 185 84           |                    |
| Lincoln, . . . . .                        | 86 42            |                    |
| Lowell (North), . . . . .                 | 13 44            |                    |
| Lowell (South), . . . . .                 | 11 36            |                    |
| Marlborough, . . . . .                    | 7 14             |                    |
| North Reading, . . . . .                  | 3 14             |                    |
| Sudbury, . . . . .                        | 2 61             |                    |
| Stoneham, . . . . .                       | 173 51           |                    |
| Townsend, . . . . .                       | 7 07             |                    |
| Tyngsborough, . . . . .                   | 184 58           |                    |
| Watertown, . . . . .                      | 169 91           |                    |
| Wayland, . . . . .                        | 3 80             |                    |
|   |                  | 1,032 06           |
| <i>Norfolk County.</i>                    |                  |                    |
| Cohasset, . . . . .                       | \$2 61           |                    |
| Holbrook, . . . . .                       | 35 97            |                    |
| <i>Amounts carried forward, . . . . .</i> | <i>\$38 58</i>   | <i>\$11,796 56</i> |



REPAIR AND MAINTENANCE EXPENDITURES — *Concluded.*

| TOWN OR CITY.                             | Amount.    | Totals.     |
|---|------------|-------------|
| <i>Amounts brought forward,</i> . . . . . | \$38 58    | \$11,796 56 |
| Holbrook-Weymouth, . . . . .              | 14 50      |             |
| Norfolk, . . . . .                        | 69 66      |             |
| Norwood, . . . . .                        | 135 04     |             |
| Walpole, . . . . .                        | 277 95     |             |
| Wrentham . . . . .                        | 162 13     |             |
| Weymouth, . . . . .                       | 108 57     |             |
| <i>Nantucket County.</i>                  |            | 806 43      |
| Nantucket, . . . . .                      | \$172 93   |             |
| <i>Plymouth County.</i>                   |            | 172 93      |
| Brockton, . . . . .                       | \$24 25    |             |
| Duxbury, . . . . .                        | 59 66      |             |
| Hingham, . . . . .                        | 101 05     |             |
| Marion, . . . . .                         | 119 31     |             |
| Marshfield, . . . . .                     | 141 65     |             |
| Mattapoisset, . . . . .                   | 68 85      |             |
| Middleborough, . . . . .                  | 187 25     |             |
| Plymouth, . . . . .                       | 502 93     |             |
| Scituate, . . . . .                       | 172 96     |             |
| Whitman, . . . . .                        | 104 26     |             |
| Wareham, . . . . .                        | 19 93      |             |
| <i>Suffolk County.</i>                    |            | 1,502 10    |
| Revere, . . . . .                         | \$9 19     |             |
| <i>Worcester County.</i>                  |            | 9 19        |
| Athol, . . . . .                          | \$2,664 16 |             |
| Auburn, . . . . .                         | 134 70     |             |
| Barre, . . . . .                          | 6 47       |             |
| Brookfield, . . . . .                     | 1 60       |             |
| Fitchburg, . . . . .                      | 106 73     |             |
| Grafton, . . . . .                        | 10 34      |             |
| Gardner, . . . . .                        | 77 38      |             |
| Hardwick-New Braintree, . . . . .         | 10 34      |             |
| Holden, . . . . .                         | 17 08      |             |
| Leicester, . . . . .                      | 2,211 80   |             |
| Northborough, . . . . .                   | 6 62       |             |
| Paxton, . . . . .                         | 133 38     |             |
| Phillipston, . . . . .                    | 51 90      |             |
| Princeton, . . . . .                      | 5 85       |             |
| Shrewsbury, . . . . .                     | 123 09     |             |
| Sturbridge, . . . . .                     | 58 68      |             |
| Sterling, . . . . .                       | 50         |             |
| Westminster, . . . . .                    | 287 19     |             |
| Worcester, . . . . .                      | 385 94     |             |
| Warren, . . . . .                         | 75 71      |             |
| Westborough, . . . . .                    | 4 49       |             |
|   |            | 6,373 95    |
| Total, . . . . .                          |            | \$20,661 16 |

## GENERAL EXPENSES TO JUNE 15, 1898.

|  |                   |
|--|-------------------|
| Salaries of commissioners, . . . . .   | \$2,733 33        |
| Travel of commissioners, . . . . .   | 576 78            |
| Clerical assistants, . . . . .   | 3,615 46          |
| Printing, including postal cards and stamped envelopes, . . . . .  | 598 31            |
| Advertising hearings, . . . . .  | 33 30             |
| Office supplies, . . . . .   | 288 22            |
| Geologist's assistant and expenses, . . . . .  | 91 55             |
| Telephone, including tolls, . . . . .  | 180 96            |
| Postage, . . . . .   | 54 31             |
| Examination of titles and appraisal of property, . . . . .   | 176 94            |
| Miscellaneous items, consisting of telegraph and express charges, car fares and minor office expenses, . . . . . | 258 11            |
| Total, . . . . .   | <u>\$8,607 27</u> |

## GENERAL EXPENSES FROM JUNE 15, 1898.

[Under Acts of 1898, chapter 528.]

|  |                    |
|--|--------------------|
| Salaries of commissioners, . . . . .   | \$3,266 67         |
| Travel of commissioners, . . . . .   | 767 18             |
| Clerical assistants, and chief, first and second assistant engineers, . . . . .                                  | 9,023 10           |
| Printing, including postal cards and stamped envelopes, . . . . .  | 482 40             |
| Advertising hearings, . . . . .  | 84 06              |
| Office supplies, . . . . .   | 159 71             |
| Geologist's apparatus and expenses, . . . . .  | 97 23              |
| Telephone, including tolls, . . . . .  | 125 18             |
| Postage, . . . . .   | 87 35              |
| Examination of titles, . . . . .   | 37 35              |
| Miscellaneous items, consisting of telegraph and express charges, car fares and minor office expenses, . . . . . | 138 75             |
| Total, . . . . .   | <u>\$14,268 98</u> |

## RELOCATION OF STREET RAILWAYS.

[Under Acts of 1896, chapter 541.]

|   |                     |
|---|---------------------|
| Merrimac, 1897 section, . . . . .         | \$3,451 48          |
| Sturbridge, 1897 section, . . . . .       | 1,917 68            |
| Total, . . . . .                          | <u>\$5,369 16</u>   |
| Total expenditure for the year, . . . . . | <u>\$548,689 44</u> |



STATEMENT OF CLAIMS AGAINST THE COMMISSION.  
[As required by chapter 366, Acts of 1898.]

| NAME.  | Residence.    | Nature of Claim.   | Amount.  | Remarks.                |
|--|---------------|--|----------|-------------------------|
| Booth, R., . . . . .                         | Whitman, .    | Damages owing to change of grade, . . . . .                              | -        | Suit entered.           |
| Gookin, J. S., . . . . .                     | Revere, .     | Damages caused by construction of State highway in Revere, . . . . .     | \$10 77* | Award not yet accepted. |
| Gould, C. E., . . . . .                      | Leicester, .  | Damages caused by taking of land and change of grade, . . . . .          | 800 00   | Suit entered.           |
| Graves, E. S., and Brown, C. A., . . . . .   | Marblehead, . | Damages caused by construction of State highway in Swampscott, . . . . . | 602 25*  | Suit entered.           |
| Haviland, J. B., . . . . .                   | Ludlow, .     | Bill for services in making surveys, . . . . .                           | 948 74   | Suit entered.           |
| Moseley, S. E., . . . . .                    | Revere, .     | Damages caused by construction of State highway in Revere, . . . . .     | 33 65*   | Award not yet accepted. |
| Norcross, A. O., . . . . .                   | Revere, .     | Damages caused by construction of State highway in Revere, . . . . .     | 132 08*  | Award not yet accepted. |
| Palmer, J. P., estate, . . . . .             | Swampscott, . | Damage caused by construction of State highway in Swampscott, . . . . .  | 141 00*  | Award not yet accepted. |
| Parker, C. H., . . . . .                     | Revere, .     | Damage caused by construction of State highway in Revere, . . . . .      | 4 16*    | Award not yet accepted. |
| Suburban Gas and Electric Company, . . . . . | Revere, .     | Damages caused by construction of State highway in Revere, . . . . .     | 95 16*   | Award not yet accepted. |
| Wilkins, M. A., . . . . .                    | Swampscott, . | Damages caused by construction of State highway in Swampscott, . . . . . | 5 00*    | Award not yet accepted. |
| Wyman, Isaac C., . . . . .                   | Swampscott, . | Damages caused by construction of State highway in Swampscott, . . . . . | 44 50*   | Award not yet accepted. |

\* Amount awarded.

T. C. MENDENHALL,  
W. E. MCCLINTOCK,  
CHARLES W. ROSS,  
*Massachusetts Highway Commission.*



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APPENDIX.

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## APPENDIX A.

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### REPORT OF CHIEF ENGINEER.

Boston, Dec. 31, 1898.

*To the Massachusetts Highway Commission.*

GENTLEMEN:—I herewith submit the following report of work done during the year 1898. Nearly all the work laid out in 1897 is completed. Most of the work laid out early in 1898 is also completed, the appropriation for this having been made in 1897, for the purpose of beginning construction before the appropriation of 1898 would be available. A number of roads are uncompleted, owing to the lateness of the appropriation; and, on account of the weather, work on most of the roads was suspended three weeks earlier than last year.

Construction work during the past year has been carried on under 111 contracts, covering 124 lay-outs, made in 12 cities and 75 towns.

The following statement exhibits the principal operations of the engineering and construction departments during the year 1898:—

|  |            |
|--|------------|
| Excavation and borrow (cubic yards), . . .       | 258,646.00 |
| Ledge excavation (cubic yards), . . .            | 16,676.51  |
| Culverts built (approximate number), . . .       | 393*       |
| Bridges built, . . . . .                         | 16*        |
| Dry masonry (cubic yards), . . . . .             | 3,784.43   |
| Cement masonry (cubic yards), . . . . .          | 4,634.72   |
| Gravel (cubic yards), . . . . .                  | 40,379.60  |
| Telford (square yards), . . . . .                | 9,958.50   |
| Shaping (square yards), . . . . .                | 476,492.00 |
| Macadam and gravel surfacing (square yards), . . | 391,746.00 |
| Broken stone (tons), . . . . .                   | 116,267.41 |
| Guard rail (lineal feet), . . . . .              | 55,483.40  |
| Side drains (lineal feet), . . . . .             | 74,611.00  |

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\* Includes some work done in 1897.



|                                    |                         |          |
|------------------------------------|-------------------------|----------|
| Vitrified clay pipe (lineal feet), | { smaller than 12-inch, | 4,357.00 |
|                                    | { 12-inch, . . .        | 8,768.00 |
|                                    | { 15-inch, . . .        | 98.00    |
|                                    | { 18-inch, . . .        | 338.00   |
|                                    | { 24-inch, . . .        | 1,065.00 |
| Iron pipe (lineal feet),           | { 10-inch, . . .        | 120.00   |
|                                    | { 12-inch, . . .        | 495.00   |
|                                    | { 16-inch, . . .        | 72.00    |
|                                    | { 18-inch, . . .        | 325.00   |
|                                    | { 24-inch, . . .        | 134.00   |
| Stone bounds set, . . . . .        | { 30-inch, . . .        | 25.00    |
|                                    |                         | 1,142.00 |

## STATEMENT OF EXPENDITURES FOR 1898.

The Legislature of 1897 appropriated \$200,000 for construction in 1898. This amount enabled the commission to make allotments early in the year, and construction began as soon as the necessary work incident to the preparation of lay-outs and contracts could be done. The Legislature of 1898 appropriated \$400,000, of which \$300,000 was for work in 1898. If the 1898 appropriation had been available May 1 the work of construction could have been completed by December 1, except such grading of roads as the commission might determine to have done late in the season.

## BRIDGES.

In the past year more bridges have been built and contracted for than during the whole previous period since July, 1894, when the construction of State highways first began.

Bridges of the following construction have been contracted for or built in the towns named:—

Plate girder bridges, wooden floor: Ashfield, Buckland and Williamsburg.

I-beam construction, wooden floor: Brookfield, Buckland, Warren, Windsor and Westminster.

I-beam construction, solid floor, brick arches: Lunenburg and Sudbury.

Wooden bridges: Russell, two; Gardner, two.

## MAINTENANCE.

The amount expended in maintenance has been for the most part caused by the cleaning of gutters and the placing of bind-

ing material upon roads travelled mostly by light vehicles and upon roads which are exposed to sweeping winds, which remove the binder faster than the wear of the stone supplies it. The dry weather of August also made it necessary to put binding material on some roads which were unaffected by previous dry spells.

The very high tide of Nov. 27, 1898, forced the water over roads on the Cape and at Martha's Vineyard, and was the cause of considerable expense for repairs on the roads in Brewster, Dennis, Sandwich and Cottage City.

The high tide of February, 1898, went over nearly a mile of the Cottage City road, removing the binder and cutting an opening at the bridge over Sengekontacket River. A portion of the crest of the beach was also washed away, and, if not replaced by the action of the waves, it will be necessary to build jetties, as was done on the other side of the river.

At Athol the retaining wall which was overthrown by the washing effect of two heavy showers in the summer of 1897 has been rebuilt in a substantial manner, and to a thickness corresponding to its height, the old wall being but 2 feet thick where the height was 8 feet. As the wall was in place at the time the road was taken as a State highway, and had stood two winters with no apparent defect, the expense of rebuilding it should be charged to construction instead of repairs.

The tendency to allow horses to travel in a single track is less now than when the roads were first built. The care taken by drivers on most roads to avoid this is due in part to the erection of "Don't drive in the middle of the road" signs, and also because drivers see the necessity of using the entire surface of the road, in order to keep it smooth. In the table showing the width commonly used for travel on the different roads it will be observed that the travel is still too restricted; and, as no surface can long withstand a constant striking of horses' hoofs at one point, this will explain why horse tracks gradually appear on our roads.

Formerly, when horse tracks formed on a road, it was necessary to fill them with No. 2 stone, covering with screenings and rolling with a steam roller, or, if more convenient, with a horse roller. The result was that the horses would continue to travel

in the old track, kick out the stone in a dry time and make more repairs necessary. If the horse track is filled with No. 2 stone, without screenings, the horses avoid it and travel on the sides, and the wheels gradually compact the stone. It is then not so easily kicked out as when compacted by a roller, and the horse track does not appear.

When screenings have been blown or washed off the roads, and binder is needed to prevent the stone from unravelling, screenings, blue gravel, clayey sand and coarse sharp sand have been used, to determine the value of the different binding material. The best results thus far have been obtained by using coarse sharp sand.

Several sections of road have been surfaced with selected gravel. Where they are continuations of roads surfaced with broken stone, the amount and character of the travel therefore being practically the same as on the stone sections, the effect of the travel on the macadam and the gravel is easily compared. It is seen that the gravel surface does not stand the travel so well as the macadam. The gravel road, although very good in dry weather, becomes rutted in wet periods, and the expense of maintenance is very much larger than for a stone road.

The Brimfield and West Boylston roads have been surfaced with gravel from which all material other than stone was removed. The gravel was put on in courses similar to broken stone, and rolled with a steam roller. The results so far have been satisfactory.

At Truro, where the stone supply is limited to that found on the shore of the bay and where the material in the road bed is loose sand, a short section of road was built of clay and screened beach gravel. This gave good results, and the remainder of the section graded in 1897 has been covered with clay and No. 2 broken stone, but is not yet completed. If it proves satisfactory, it will be possible to surface, at a cost of about \$2,000 per mile, the Cape roads, on which the travel is mainly in light carriages.

In building roads where the soil is clayey, and good sandy gravel can be obtained, the gravel has been used in place of telford with good results. At Leicester, as gravel for the

1898 lay-out would have to be hauled for some distance, and as stone, although of poor quality, was abundant and would cost no more than gravel, 6 inches of broken stone as it came from the crusher was used for a foundation. Next spring will determine whether this mode of construction is advisable.

#### ELECTRIC RAILWAYS.

In many cases where electric railways were built on roads before the roads were taken for State highways, the lines and grades for the tracks were not supplied by the proper authorities, and the railway companies, not wishing to incur the expense of reducing grades, changing travelled way, etc., so located the tracks as not to interfere with the travel, reducing the grades only where it could be done at comparatively slight expense. Had greater changes been made in that part of the road occupied by the tracks, changes in the grade of the road bed of the highway would also have been necessary.

If electric street railway companies, when they petition a town or a city for a location for tracks, are given definite locations and grades, and made to conform to them in the construction of the railway, much annoyance and trouble to the authorities, as well as expense to the railway companies, would be saved. Roads having railways so located could then be taken for State highways without subjecting the railway companies to the expense and trouble of making changes. The Taunton & Providence Electric Street Railway Company so placed its tracks that no changes will be necessary when the highway is reconstructed.

#### HANCOCK ROAD.

The commission having made an allotment for the Hancock road early in the year, a section of road was laid out and constructed as far as could be until provision should be made for its continuance in Lebanon, N. Y., by the authorities of that State, as in order to obtain a feasible grade it was necessary to abandon the old road and follow a new location, which, at the State line, is several hundred feet from the old road and 125 feet above it.



The supervisors of Columbia County, N. Y., petitioned the State engineer of New York to expend a portion of the appropriation for improvement of highways in constructing a road in Lebanon to connect with the state highway in Hancock; which petition was granted, and an allotment for the road was made, the contract was let and construction has been begun. The route followed is substantially as petitioned for. An appropriation should be made early in spring to allow the Hancock road to be completed for the summer travel.

#### SWAMPSCOTT ROAD.

The new State highway at Swampscott, through Paradise Woods to Salem Street, passes for about 1,400 feet over a meadow, through which a fill about 3 feet in depth was made for the road. Drains were put in, and on the southerly side of the ditch which drained the meadow gravel was found less than 2 feet below the surface. On the northerly side of the ditch was gravelly subsoil, and about 200 feet northerly from the ditch was a slight depression in which water stood. To dispose of this water an iron pipe was laid under the road, and, as the excavation was through muck and loam, the pipe was laid on grillage.

The road bed had been rough-graded early in the spring, when frost was in the ground. When the frost came out some settlement was noticed, but was attributed to the soft sub-grade, and teams continued to pass over the place, carrying pipe, stone and other material. When the road was brought to a finished grade the settlement became evident. Soundings were then taken, which showed that the soft material extended for about 450 feet, and its depth gradually increased from the solid land on each side towards the centre, where, for about 60 feet, a maximum depth of 23 feet below grade was found. The place was again brought up to a finished grade, and the contractors allowed the public to use the road. I went to examine the road for acceptance, but noticed further settlement, and ordered it filled, and the road was closed for travel. Shortly afterward it was reported that this section of road had settled 2 feet. It was again filled, and when the ground froze the road for a length of 125 feet again settled to a depth varying from 0 at



Table showing the highways constructed or contracted for by the commission, and the nature of the several constructions, to Jan. 1, 1899.

| TOWN.       | Year.      | County.     | MAIN WAY.          |                         | ROAD Laid OUT.                          |                 | Length. | CHARACTER OF — |                             | WIDTH.                    |           |          | MATERIAL USED IN CONSTRUCTION OF — |                                 | Kind of Broken Stone. | Maximum Grade (feet per 100). | Contractor.  | Remarks.  |
|-------------|------------|-------------|--------------------|-------------------------|---|-----------------|---------|----------------|-----------------------------|---------------------------|-----------|----------|------------------------------------|---------------------------------|-----------------------|-------------------------------|--|---|
|             |            |             | From               | To                      | From                                    | To              |         | Constructed.   | Old Road.                   | Natural Soil.             | Location. | Macadam. | Shoulders.                         | Shoulders.                      | Road Bed.             |                               |  |   |
| Acushnet.   | 1897.      | Bristol.    | New Bedford.       | Boston (old main road). | 1,500 feet east from New Bedford line.  | Northerly.      | .63     | .63            | Gravel.                     | Sandy loam.               | 50+1      | 15       | 3                                  | Material from old road surface. | Broken stone.         | 5.70                          | Town of Acushnet.  |   |
| Adams.      | 1897.      | Berkshire.  | North Adams.       | Putfield.               | Chester line.                           | Northerly.      | .67     | .67            | Gravel.                     | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.                   | Broken stone.         | 5.60                          | Geo. Shand of Adams.   | Iron bridge, solid floor.   |
| Andover.    | 1893, '96. | Essex.      | Lawrence.          | Boston.                 | Lawrence line.                          | Northerly.      | 1.22    | 1.22           | Gravel surface.             | Loose sand and gravel.    | 50        | 18       | 3                                  | Gravel.                         | Broken stone.         | 4.94                          | 1895, local stone base, Salem trap top; 1896, Salem trap.                  | Steel railway within location at one side.  |
| Andover.    | 1897.      | Essex.      | Lawrence.          | Boston.                 | North Hadfield line.                    | Northerly.      | .48     | .48            | Sandy gravel.               | Sand and ledge.           | 60        | 15       | 3                                  | Gravel.                         | Broken stone.         | 6.00                          | Town of Andover.   |   |
| Ashby.      | 1894-'97.  | Middlesex.  | Fitchburg.         | New Hampshire line.     | Ashby post-office.                      | Southerly.      | 2.46    | 2.46           | Gravel and loam, some sand. | Sandy gravel, some clay.  | 140-60    | 20-18-10 | 3                                  | Gravel.                         | Broken stone.         | 5.60                          | Town of Ashby.   | Relocation of part to reduce grade; wooden bridge of 21 foot span built over Willard's brook. |
| Ashby.      | 1898.      | Middlesex.  | Fitchburg.         | New Hampshire line.     | End of 1897 lay-out.                    | Southerly.      | .68     | .68            | Gravel and loam.            | Gravel, loam, some ledge. | 50        | 15       | 3                                  | Gravel.                         | Broken stone.         | 5.52                          | Town of Ashby.   |   |
| Ashfield.   | 1897.      | Franklin.   | Shelburne Falls.   | Ashfield.               | One mile north of Ashfield post-office. | Northerly.      | .74     | .74            | Sand and loam.              | Sandy loam, boulders.     | 70        | Graded.  | —                                  | —                               | —                     | 6.10                          | Keene & Foster of Boston.  | New location being graded.  |
| Ashfield.   | 1898.      | Franklin.   | Shelburne Falls.   | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .87     | .87            | Sand and loam.              | Sandy loam, boulders.     | 50-70     | Graded.  | —                                  | —                               | —                     | 6.35                          | Walsh Hollar and Iron Works, Tuttle & Edgerly, Joseph D. Gannett, grading. | Plate girder bridge, 33 foot span.  |
| Athol.      | 1893, '96. | Worcester.  | Boston.            | Williamstown.           | Orange line.                            | Easterly.       | 1.61    | 1.61           | Gravel.                     | Gravelly.                 | 50        | 17       | 3                                  | Gravel.                         | Broken stone.         | 4.50                          | Town of Athol.   | Street railway within location at one side.   |
| Attum.      | 1893-'97.  | Worcester.  | Worcester.         | Connecticut line.       | Dana's mill.                            | Southerly.      | 1.93    | 1.93           | Gravel and loam.            | Gravel and loam.          | 50        | 15       | 3                                  | Gravel.                         | Broken stone.         | 4.70                          | Town of Attum.   |   |
| Attum.      | 1898.      | Worcester.  | Worcester.         | Connecticut line.       | Worcester line.                         | Southerly.      | .16     | .20            | Gravel and loam.            | Gravel and loam.          | 50        | 18       | 3                                  | Gravel.                         | Broken stone.         | 2.31                          | Town of Attum.   |   |
| Barnstable. | 1897.      | Barnstable. | Plymouth.          | Chatham.                | Yarmouth line.                          | Westerly.       | .83     | .83            | Loamy gravel.               | Sand and sandy loam.      | 40+1      | 18-15    | 3                                  | Loamy gravel.                   | Broken stone.         | 4.23                          | A. J. Wellington of Boston.  |   |
| Barnstable. | 1897.      | Worcester.  | Worcester.         | Chatham.                | Bridge over Ware River.                 | Westerly.       | .67     | .67            | Gravel.                     | Clay and gravel.          | 19.5      | 15       | 3                                  | Gravel.                         | Broken stone.         | 2.03                          | Thos. Hemmessey of Boston.   |   |
| Barnstable. | 1897.      | Middlesex.  | Boston.            | New Hampshire line.     | Lexington line.                         | North-westerly. | .65     | .65            | Sand and gravel.            | Sand and gravel.          | 50        | 15       | 3                                  | Gravel.                         | Broken stone.         | 4.39                          | Wm. H. Magne of Newton.  |   |
| Beverly.    | 1893, '97. | Essex.      | Boston.            | Newburyport.            | Wentham line.                           | Southerly.      | 1.63    | 1.63           | Gravel.                     | Gravelly.                 | 50-60     | 18       | 3                                  | Gravel.                         | Broken stone.         | 2.90                          | City of Beverly.   | Street railway east side of road.   |
| Beverly.    | 1898.      | Essex.      | Boston.            | Newburyport.            | End of 1897 lay-out.                    | Southerly.      | .63     | .63            | Gravel.                     | Clayey sand and gravel.   | 60        | 18       | 3-2                                | Gravel.                         | Broken stone.         | 1.70                          | City of Beverly.   |   |
| Beverly.    | 1897.      | Barnstable. | Fall River.        | Cape Cod.               | Coliaset Narrows.                       | Southerly.      | .35     | .35            | Shell, clodders, loam.      | Sand.                     | 45+1      | 15       | 3                                  | Material from old road surface. | Broken stone.         | 4.00                          | Wm. H. Magne of Newton.  |   |
| Beverly.    | 1898.      | Barnstable. | Fall River.        | Cape Cod.               | End of 1897 lay-out.                    | Easterly.       | 1.07    | .99            | Loamy gravel.               | Sand and sandy gravel.    | 45        | 15       | 3                                  | From old road, sandy gravel.    | Broken stone.         | 1.10                          | Town of Bourne.  |   |
| Beverly.    | 1897.      | Middlesex.  | Boston.            | Williamstown.           | Aetna line.                             | Westerly.       | .68     | .76            | Gravel.                     | Gravel.                   | 60        | 15       | 3                                  | Gravel.                         | Broken stone.         | 3.82                          | Town of Buxborough.  |   |
| Brewster.   | 1896-'97.  | Barnstable. | Boston.            | Provincetown.           | Dennis line.                            | Easterly.       | 2.48    | 2.48           | Sand, clay and loam.        | Sand and clay.            | 10-50     | 15       | 3                                  | Gravel, sandy.                  | Broken stone.         | 1.50                          | Town of Brewster.  | Stone supply collected during winter season.  |
| Buckfield.  | 1897.      | Franklin.   | Shelburne Falls.   | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .74     | .74            | Sandy gravel.               | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.                   | Broken stone.         | 3.10                          | A. J. Wellington of Boston.  |   |
| Buckfield.  | 1897.      | Franklin.   | Shelburne Falls.   | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .74     | .74            | Sandy gravel.               | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.                   | Broken stone.         | 3.10                          | A. J. Wellington of Boston.  |   |
| Buckfield.  | 1897.      | Franklin.   | Shelburne Falls.   | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .74     | .74            | Sandy gravel.               | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.                   | Broken stone.         | 3.10                          | A. J. Wellington of Boston.  |   |
| Buckfield.  | 1897.      | Franklin.   | Shelburne Falls.   | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .74     | .74            | Sandy gravel.               | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.                   | Broken stone.         | 3.10                          | A. J. Wellington of Boston.  |   |
| Buckfield.  | 1897.      | Franklin.   | Shelburne Falls.   | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .74     | .74            | Sandy gravel.               | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.                   | Broken stone.         | 3.10                          | A. J. Wellington of Boston.  |   |
| Buckfield.  | 1897.      | Franklin.   | Shelburne Falls.   | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .74     | .74            | Sandy gravel.               | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.                   | Broken stone.         | 3.10                          | A. J. Wellington of Boston.  |   |
| Buckfield.  | 1897.      | Franklin.   | Shelburne Falls.   | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .74     | .74            | Sandy gravel.               | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.                   | Broken stone.         | 3.10                          | A. J. Wellington of Boston.  |   |
| Buckfield.  | 1897.      | Franklin.   | Shelburne Falls.   | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .74     | .74            | Sandy gravel.               | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.                   | Broken stone.         | 3.10                          | A. J. Wellington of Boston.  |   |
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Table showing the highways constructed or contracted for by the commission, and the nature of the several constructions, to Jan. 1, 1899—Continued.

| TOWN.                   | Year.           | County.    | MAIN WAY.           |                        | ROAD Laid OUT.                       |                 | Direction. | Length. | Constructed.             | Old Road.                  | Natural Soil.  | WIDTHS.        |             |            | MATERIAL USED IN CONSTRUCTION OF—          |               | Kind of Broken Stone.   | Maximum Grade (feet per 100). | Contractor.   | Remarks.   |
|-------------------------|-----------------|------------|---------------------|------------------------|--------------------------------------|-----------------|------------|---------|--------------------------|----------------------------|----------------|----------------|-------------|------------|--|---------------|---|-------------------------------|---|--|
|                         |                 |            | From.               | To.                    | From.                                | To.             |            |         |                          |                            |                | Location.      | Macadam.    | Shoulders. | Shoulders.                                 | Road Bed.     |   |                               |   |  |
| Gloucester.             | 1804, '05.      | Essex.     | Boston.             | Cape Ann.              | Manchester line.                     | North-easterly. | 1.60       | 1.60    | Gravel.                  | Sandy, with boulders.      | Feet.          | 50             | 16          | 3          | Gravel.                                    | Broken stone. | Local boulders.   | 5.00                          | 1891, City of Gloucester; 1895, T. Stuart & Son of Newton.  | Road bed raised; grade bettered.   |
| Gloucester.             | 1808.           | Essex.     | Boston.             | Cape Ann.              | End of 1895 lay-out.                 | North-easterly. | .88        | .78     | Gravel.                  | Gravel, clay and ledge.    | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Local ledge.  | 5.00                          | City of Gloucester.   |  |
| Hosken.                 | 1894, '95.      | Hampshire. | Hillsfield.         | Northampton.           | Quacken Village.                     | South-easterly. | 1.24       | 1.24    | Loam.                    | Clayey.                    | 50             | 50             | 15          | 3          | Sandy gravel.                              | Broken stone. | Local boulders.   | 5.01                          | Town of Goshen.   |  |
| Drafton.                | 1877.           | Worcester. | Worcester.          | Providence.            | Millinery line.                      | Easterly.       | .79        | .79     | Gravel.                  | Gravel.                    | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Local stone.  | 2.08                          | Town of Grafton.  | Relocated in part in 1895, grade; much telford and gravel used.                              |
| Granby.                 | 1894.           | Hampshire. | Holyoke.            | Worcester County.      | South Hadley line.                   | North-easterly. | .63        | .63     | Sand.                    | Clay over sand.            | 36             | 36             | 15          | 3          | Gravel.                                    | Broken stone. | Salem trap.   | 2.70                          | Town of Granby.   |  |
| Great Barrington.       | 1891, '90, '91. | Berkshire. | Housatonic valley.  | Springfield.           | Housatonic River.                    | Easterly.       | 2.79       | 2.79    | Gravel.                  | Gravel and sandy loam.     | 40-50-70       | 40-50-70       | 18-15-2     | 3          | 1894 lay-out, gravel.                      | Broken stone. | 1891, Meriden trap.   | 6.00                          | Town of Great Barrington.   | Wooden bridge built of 25 foot span. 1890, location changed in part.                         |
| Hadley.                 | 1891-97.        | Hampshire. | Northampton.        | Amherst.               | Connecticut River bridge.            | Easterly.       | 1.78       | 1.78    | Loamy sand.              | Sandy loam and clay.       | 50-82, 5-60-4+ | 50-82, 5-60-4+ | 15          | 3          | Sandy gravel, sandy loam.                  | Broken stone. | 1891-96, Salem and Deerfield trap; 1897, Deerfield trap.                            | 1.00                          | 1891-93, Town of Hadley; 1897, A. J. Wellington of Boston.  | 1891, road bed raised above flood mark at Connecticut River.                                 |
| Hadley.                 | 1898.           | Hampshire. | Northampton.        | Amherst.               | End of 1897 lay-out.                 | Easterly.       | .46        | .46     | Loamy sand.              | Sandy loam and clay.       | 50-66          | 50-66          | 15          | 3          | Sandy gravel.                              | Broken stone. | Deerfield trap.   | .43                           | A. J. Wellington of Boston.   |  |
| Hancock.                | 1895, '96.      | Berkshire. | Boston.             | New York line.         | Pittsfield line.                     | Westerly.       | 1.69       | 1.69    | Loam.                    | Loam and clay.             | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Gravel.   | 5.50                          | 1895, Hendrick, Taylor & Warner of Easthampton; 1896, Lathrop & Shien, Easthampton, Conn.           | 1895, new location taken to secure reasonable grades.  |
| Hancock.                | 1898.           | Berkshire. | Boston.             | New York line.         | End of 1890 lay-out.                 | Westerly.       | .55        | .55     | Gravel and clay.         | Gravelly clay.             | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Gravel.   | 3.70                          | Harris & Lettucey of Boston.  |  |
| Hartwick.               | 1897.           | Worcester. | Worcester.          | Providence.            | New Braintree line.                  | North-easterly. | .39        | .39     | Sandy gravel.            | Gravel.                    | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Trap rock.  | 1.51                          | A. J. Wellington of Boston.   |  |
| Hingham.                | 1891.           | Plymouth.  | Boston.             | Providence.            | Weymouth Back River.                 | Easterly.       | 1.12       | 1.12    | Gravel.                  | Gravelly.                  | 31             | 31             | 15          | 3          | Gravel.                                    | Broken stone. | Gravel.   | 1.51                          | Town of Hingham.  | Gravel surface 20 foot wide, steel railway at roadside.                                      |
| Hingham.                | 1896, '97.      | Plymouth.  | Boston.             | Providence.            | Near Cohasset line.                  | Westerly.       | 1.23       | 1.23    | Broken stone and gravel. | Sandy loam and ledge.      | 50-33-4+       | 50-33-4+       | 15          | 3          | Gravel.                                    | Broken stone. | 1896, granite from North Cohasset and Hingham blue stone; 1897, Hingham blue stone. | —                             | Town of Hingham.  |  |
| Holliston.              | 1891, '90.      | Norfolk.   | Norfolk County.     | Plymouth.              | Weymouth line.                       | Westerly.       | 1.11       | 1.11    | Sand, gravel and loam.   | Loam and gravel.           | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Local field and ledge stone.  | 5.00                          | 1891, Wm. T. Davis of Boston; 1896, Duncan Hink of Boston; 1899, John S. Lane & Son of Springfield. | 1891, part of way through cedar swamp; 1894 contract made for macadamizing 1891-97 lay-outs. |
| Holden.                 | 1891-97.        | Worcester. | Worcester.          | Gardner.               | 1894-96, Holden Village.             | Northerly.      | 2.70       | 2.70    | Gravel, sandy gravel.    | Sandy loam and gravel.     | 30-43, 5-4+    | 30-43, 5-4+    | 18-15       | 3          | Gravel.                                    | Broken stone. | Field stone.  | 5.00                          | Town of Holden.   | Grade crossing abolished by Town, Fitchburg Railroad and Commonwealth.                       |
| Holden.                 | 1898.           | Worcester. | Worcester.          | Gardner.               | 1897, end of 1894 lay-out.           | Southerly.      | .46        | .46     | Gravel, sandy gravel.    | Loam, gravel, clay, sand.  | 50             | 50             | 15          | 3-5        | Gravel.                                    | Broken stone. | Local field stone.  | 2.48                          | Town of Holden.   |  |
| Huntington.             | 1895, '96.      | Hampshire. | Boston.             | Pittsfield.            | Russell line.                        | Westerly.       | 1.01       | 1.01    | Gravel and loam.         | Gravelly.                  | 60+            | 60+            | 15          | 3          | Gravel.                                    | Broken stone. | West Springfield trap.  | 3.10                          | Town of Huntington.   | Considerable retaining wall necessary.   |
| Lawrence.               | 1890.           | Essex.     | Lowell.             | Mouth of the Merrimac. | Methuen line.                        | Southerly.      | .27        | .27     | Gravel.                  | Gravelly, some clay.       | 50             | 50             | 18          | 7          | Gravel.                                    | Broken stone. | Local stone.  | 1.26                          | City of Lawrence.   |  |
| Lee.                    | 1894, '96.      | Berkshire. | Boston.             | New York line.         | Lee Park.                            | Easterly.       | 1.08       | 1.08    | Gravel.                  | Gravelly.                  | 10-35-51       | 10-35-51       | 21-16       | 3          | Gravel.                                    | Broken stone. | 1891, local quartzite base, Meriden trap top; 1895, '96, Meriden trap.              | 5.00                          | 1894, '95, Town of Lee; 1896, E. T. Lee & Co. of Springfield.                                       | 1894, iron bridge of 10 foot span built, asphalt surface.                                    |
| Leicester.              | 1891-96.        | Worcester. | Boston.             | New York line.         | Worcester line.                      | Westerly.       | 2.61       | 2.61    | Gravel and clay.         | Clay and hard pan.         | 39-53-67-4+    | 39-53-67-4+    | 21-18-16-10 | 3-5-5      | Gravel and broken stone.                   | Broken stone. | Local stone base, West Springfield trap top.  | 6.50                          | Town of Leicester.  | 1890, street railway tracks relocated.   |
| Leicester.              | 1898.           | Worcester. | Boston.             | New York line.         | End of 1890 lay-out.                 | Westerly.       | 1.65       | 1.65    | Clay and loam.           | Clay and loam.             | 55+            | 55+            | 15          | 3-5        | Material from excavation and broken stone. | Broken stone. | Local field stone.  | 6.10                          | Town of Leicester.  | 1890, street railway tracks relocated.   |
| Lexington.              | 1893, '97.      | Middlesex. | Boston.             | Massachusetts Avenue.  | Massachusetts Avenue.                | Westerly.       | 2.11       | 2.11    | Sand and clayey gravel.  | Sand and clayey gravel.    | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Local stone, some trap.   | 5.16                          | Town of Lexington.  | Street railway tracks relocated.   |
| Lexington.              | 1898.           | Middlesex. | Boston.             | Williamstown.          | End of 1897 lay-out to Lincoln line. | Westerly.       | 1.31       | 1.31    | Gravel.                  | Sand, clay, gravel, ledge. | 60+            | 60+            | 15          | 3          | Gravel.                                    | Broken stone. | Local stone, some trap.   | 1.72                          | Town of Lexington.  |  |
| Lincoln.                | 1895-97.        | Middlesex. | Boston.             | Williamstown.          | Chester line.                        | South-easterly. | 2.06       | 2.06    | Sand and clayey gravel.  | Sand and clayey gravel.    | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Local field stone.  | 1.25                          | Town of Lincoln.  |  |
| Lowell (Beverly).       | 1897.           | Middlesex. | New Hampshire line. | Tyngsborough line.     | Tyngsborough line.                   | Easterly.       | .97        | .97     | New road.                | Light sand.                | 60             | 60             | 15          | 3          | Sandy gravel covered with screenings.      | Broken stone. | Local stone base, Salem trap top.   | 1.04                          | A. J. Wellington of Boston.   | Grading done by county of Middlesex.   |
| Lowell (Princeton St.). | 1897.           | Middlesex. | Lowell.             | Chelmsford line.       | Chelmsford line.                     | Easterly.       | .82        | .82     | New road.                | Sand.                      | 50             | 50             | 18          | 6          | Gravel.                                    | Broken stone. | Local stone base, Salem trap top.   | 3.11                          | A. J. Wellington of Boston.   | Grading done by city of Lowell.  |
| Lowell (Princeton St.). | 1898.           | Middlesex. | Lowell.             | New Hampshire line.    | End of 1897 lay-out.                 | Easterly.       | .62        | .62     | New road.                | Sand.                      | 50±            | 50±            | 18          | 6          | Gravel.                                    | Broken stone. | Trap rock from Sterling.  | 1.56                          | Am. Goddard of Worcester.   |  |
| Mattapoisett.           | 1891, '90.      | Plymouth.  | Fall River.         | Cape Cod.              | Fitchburg line.                      | Easterly.       | .43        | .43     | Sand and gravel.         | Gravel.                    | 50             | 50             | 14          | 3          | Gravel.                                    | Broken stone. | Local stone base, Waltham trap top.   | 3.05                          | C. H. Kelleher of Newburyport.  | Bridge built, solid floor, 13 foot span.   |
| Marion.                 | 1894, '90.      | Plymouth.  | Fall River.         | Cape Cod.              | Marion Village.                      | North-easterly. | 1.18       | 1.48    | Sandy gravel.            | Sand and hard pan.         | 40             | 40             | 15          | 3          | Gravel.                                    | Broken stone. | Local boulders and field stone.   | 5.01                          | Town of Marion.   | Part of road through swamp.  |
| Marion.                 | 1897.           | Plymouth.  | Fall River.         | Cape Cod.              | Marion Village.                      | Westerly.       | .57        | .57     | Gravel.                  | Sandy loam.                | 55             | 55             | 15          | 3          | Gravel.                                    | Broken stone. | Local boulders and field stone.   | 1.63                          | Town of Marion.   |  |
| Marlborough (West).     | 1897.           | Middlesex. | Boston.             | New York line.         | Northborough line.                   | Easterly.       | .73        | .73     | Sandy.                   | Sand, gravel, loam.        | 50             | 50             | 15          | 5-1-3      | Gravel.                                    | Broken stone. | Local field stone.  | 5.00                          | City of Marlborough.  | Street railway on south side.  |
| Marlborough (East).     | 1897.           | Middlesex. | Boston.             | New York line.         | Southury line.                       | Westerly.       | .40        | .40     | Sand and gravel.         | Sand and gravel.           | 50-60          | 50-60          | 15          | 3          | Gravel.                                    | Broken stone. | Local field stone.  | 2.10                          | City of Marlborough.  |  |
| Marshfield.             | 1891, '90.      | Plymouth.  | Boston.             | Provincetown.          | Duxbury line.                        | Northerly.      | .99        | .99     | Sandy gravel, loam.      | Sandy loam.                | 30-10          | 30-10          | 15          | 3          | Gravel.                                    | Broken stone. | Local boulders.   | 5.01                          | Town of Marshfield.   | Large quantity of ledge and with in 1896 lay-out.  |
| Marshfield.             | 1898.           | Plymouth.  | Boston.             | Provincetown.          | End of 1896 lay-out.                 | Northerly.      | .40        | .40     | Sandy gravel.            | Sand and sandy gravel.     | 40             | 40             | 15          | 3          | Material from road.                        | Broken stone. | Local boulders.   | 3.99                          | Town of Marshfield.   |  |
| Mattapoisett.           | 1891, '90.      | Plymouth.  | Fall River.         | Cape Cod.              | Fairhaven line.                      | Easterly.       | 1.16       | 1.16    | Sandy gravel.            | Sand and gravel.           | 38             | 38             | 15          | 3          | Gravel.                                    | Broken stone. | Local field stone.  | 1.25                          | Town of Mattapoisett.   | 1891 lay-out, trap bridge built over Mattapoisett River, 21 foot span, asphalt surface.      |
| Merrimac.               | 1897.           | Essex.     | Lowell.             | Mouth of the Merrimac. | Near Haverhill line.                 | North-easterly. | .56        | .56     | Gravel.                  | Sandy clay, some hard pan. | 50             | 50             | 15          | 4-3        | Gravel.                                    | Broken stone. | Local field stone.  | 5.10                          | C. H. Kelleher of Newburyport.  | Street railway relocated.  |
| Merrimac.               | 1898.           | Essex.     | Lowell.             | Mouth of the Merrimac. | End of 1897 lay-out.                 | North-easterly. | .30        | —       | Gravel.                  | Sandy clay and hard pan.   | 50+            | 50+            | 14          | —          | Gravel.                                    | Broken stone. | Local field stone.  | 5.70                          | Michael Cushman of Newburyport.   | Railway tracks to be relocated; south side practically done, contract made and started.      |
| Methuen.                | 1890.           | Essex.     | Lowell.             | Mouth of the Merrimac. | Lawrence line.                       | North-easterly. | 1.01       | 1.04    | Sandy gravel.            | Sand, loam.                | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Local ledge stone.  | 5.01                          | Town of Methuen.  | Railway track relocated in easterly side.  |
| Middleborough.          | 1894, '97.      | Plymouth.  | Boston.             | Barnard's Bay.         | Norwasset River.                     | Southerly.      | 2.33       | 2.33    | Sandy gravel.            | Sand, gravel, loam.        | 30-50          | 30-50          | 15          | 7-5-3      | Gravel, sandy gravel.                      | Broken stone. | Local field stone.  | 1.80                          | Town of Middleborough.  |  |
| Middleborough.          | 1898.           | Plymouth.  | Boston.             | Barnard's Bay.         | End of 1897 lay-out.                 | Southerly.      | .43        | .43     | Hard pan, gravel.        | Sandy loam and hard pan.   | 50             | 50             | 15          | 3          | Material from road and little gravel.      | Broken stone. | Local field stone.  | 1.68                          | Town of Middleborough.  |  |
| Montague.               | 1891.           | Hampden.   | Palmer.             | Connecticut line.      | Railroad bridge.                     | Northerly.      | .93        | .93     | Sandy gravel.            | Sandy gravel.              | 36             | 36             | 15          | 3          | Sandy gravel.                              | Broken stone. | Local trap.   | 2.93                          | Town of Montague.   |  |
| Montague.               | 1895.           | Franklin.  | Boston.             | Williamstown.          | Junction pipe line with ferry road.  | Southerly.      | 1.30       | 1.09    | Sand.                    | Sand.                      | 60             | 60             | 15          | 3          | Sand.                                      | Broken stone. | Greentield trap.  | 3.60                          | Town of Montague.   |  |
| Nantucket.              | 1891-96.        | Nantucket. | Nantucket.          | Stamford.              | First mile-stone.                    | Easterly.       | 3.23       | 3.23    | Loose sand.              | Loose sand.                | 66             | 66             | 15          | 3          | Screened gravel on 1891, '94 lay-outs.     | Broken stone. | Tompkin's Cove limestone; 1896, local field stone.                                  | 3.09                          | Town of Nantucket.  | Broken limestone supply freighted by vessel.   |
| Nantucket.              | 1890, '97.      | Nantucket. | Nantucket.          | Stamford.              | Easterly end of 1895 lay-out.        | Easterly.       | 1.00       | .85     | Loose sand.              | Loose sand.                | 66             | 66             | 12          | 3          | Screened gravel.                           | Broken stone. | Local stone.  | 2.11                          | A. J. Wellington of Boston.   |  |
| New Braintree.          | 1897.           | Worcester. | Palmer.             | Hartwick line.         | Hartwick line.                       | Southerly.      | .17        | .17     | Sand.                    | Sandy.                     | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Deerfield trap.   | 2.20                          | A. J. Wellington of Boston.   |  |
| Newburyport.            | 1896, '97.      | Essex.     | Lowell.             | Newburyport.           | West Newbury line.                   | Easterly.       | .88        | .88     | Sandy gravel, sand.      | Sand, some ledge.          | 60-50-4+       | 60-50-4+       | 15          | 3          | Gravel.                                    | Broken stone. | Local stone, some trap, local ledge stone.  | 5.00                          | C. H. Kelleher of Newburyport.  | Much telford, side drains and ledge; street railway on side.                                 |
| Newburyport.            | 1898.           | Essex.     | Lowell.             | Newburyport.           | End of 1897 lay-out.                 | Easterly.       | .87        | .87     | Sandy gravel and sand.   | Sand and loam.             | 75±            | 75±            | 15          | 3          | Gravel.                                    | Broken stone. | Local stone.  | 2.07                          | Michael Cushman of Newburyport.   | Street railway relocated.  |
| Norfolk.                | 1893.           | Norfolk.   | Boston.             | Providence.            | Walpole line.                        | South-easterly. | 1.45       | 1.15    | Sandy gravel, loam.      | Gravelly loam.             | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Local stone.  | 5.30                          | Hendrick, Taylor & Warner of Easthampton, grading; Town of Norfolk.                                 |  |
| North Adams.            | 1891, '93, '97. | Berkshire. | Boston.             | Williamstown.          | Williamstown line.                   | Easterly.       | 1.69       | 1.69    | Gravel.                  | Sandy gravel, some clay.   | 30-66          | 30-66          | 15          | 3          | Gravel.                                    | Broken stone. | Red granite base, Waltham trap top.   | 1.68                          | 1894, Town of North Adams; 1896, '97, M. R. Fisk of Huntington.                                     |  |
| Northampton.            | 1894.           | Hampshire. | Northampton.        | Amherst.               | Nadley bridge.                       | South-westerly. | .56        | .56     | Sand.                    | Sand.                      | 40             | 40             | 20          | 3          | Gravel.                                    | Broken stone. | Local trap.   | 1.25                          | City of Northampton.  |  |
| Northampton.            | 1897.           | Hampshire. | Northampton.        | Springfield.           | Easthampton line.                    | Northerly.      | .33        | .33     | Gravel.                  | Clay.                      | 50             | 50             | 15          | 3          | Gravel.                                    | Broken stone. | Local trap.   | 5.00                          | City of Northampton.  |  |
| Northampton.            | 1898.           | Hampshire. | Northampton.        | Springfield.           | Easthampton line.                    | Southerly.      | .27        | —       | Clay.                    | Clay.                      | 50             | 50             | 15          | —          | Gravel.                                    | Broken stone. | Local trap.   | 4.00                          | City of Northampton.  |  |

lay-out in 1871, macadam 18-16 feet wide, shoulders 3 feet wide

\* Gravel bed 21 feet in cuts, 25 feet on embankments

- Variable enthält

\* 1895 lay-out surfaced with natural soil 21 feet in cuts, 25 feet on embankment.

\* 1894 lay-out, gravel 20 feet in width, rolled; 1896, granite from Cahasset laid 15 feet wide.

\* Gap of 2,506 feet at Leicester Hill between 1895 and 1896 log-unt.

<sup>1</sup> Local stone used exclusively on small portion of 1891 lay-out.

\* Two further of screenings on shoulders.

\* 1896, No. 2, from Bell Avenue with stone isostyle.





Table showing the highways constructed or contracted for by the commission, and the nature of the several constructions, to Jan. 1, 1899—Continued.

| TOWN.                 | Year.           | County.     | MAIN WAY.        |                      | ROAD LAID OUT.                           |                 | Length Constructed. | CHARACTER OF —          |                                     | WIDTHS.   |          |            | MATERIAL USED IN CONSTRUCTION OF —         |                                  | Kind of Broken Stone.                                     | Maximum Grade (Feet per 100). | Contractor.   | Remarks.   |
|-----------------------|-----------------|-------------|------------------|----------------------|--|-----------------|---------------------|-------------------------|-------------------------------------|-----------|----------|------------|--|----------------------------------|---|-------------------------------|---|--|
|                       |                 |             | From             | To                   | From                                     | Direction.      |                     | Old Road.               | Natural Soil.                       | Location. | Macadam. | Shoulders. | Shoulders.                                 | Road Bed.                        |   |                               |   |  |
| North Attleborough.   | 1894-'97.       | Bristol.    | Boston.          | Providence.          | Bruce Avenue.                            | South-westerly. | 3.21                | Gravel and red stone.   | Clay, gravel and red conglomerate.  | 36-66     | 21-18-15 | 3          | Gravel.                                    | Broken stone; 1890, '97, gravel. | 1894, '94, local stone; 1890, '97, gravel.                | 5.50                          | 1891-96, Town of North Attleborough; 1897, C. H. Kelleher of Newburyport. | Street railway in location, 1891, '93 lay-out; iron ledge built, 14 foot span, asphalt surface, 1896 lay-out.      |
| Northborough (East).  | 1897.           | Worcester.  | Boston.          | New York line.       | Marlborough line.                        | South-westerly. | .63                 | Sandy gravel.           | Clayey sand and gravel.             | 65        | 15       | 4-3        | Gravel.                                    | Broken stone.                    | Local field stone.  | 5.00                          | A. J. Wellington of Boston.   | Street railway track on side.  |
| Northborough (South). | 1897.           | Worcester.  | Northborough.    | North-westerly.      | Westborough line.                        | North-westerly. | .42                 | Gravel.                 | Gravel, clay and loam.              | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 2.90                          | Town of Westborough.  | Portion of highway rehabilitated.  |
| Northborough (East).  | 1898.           | Worcester.  | Boston.          | New York line.       | End of 1897 lay-out.                     | Westerly.       | .73                 | Gravel.                 | Gravel, sand.                       | 60        | 15       | 1-3        | Gravel.                                    | Broken stone.                    | Local field stone.  | 5.00                          | Fred E. Ellis of Melrose.   |  |
| North Reading.        | 1897.           | Middlesex.  | Boston.          | Lawrence.            | Andover line.                            | Southerly.      | .50                 | Sandy gravel.           | Sand and gravel.                    | 60        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local ledge stone.  | 2.67                          | Town of North Reading.  |  |
| North Reading.        | 1898.           | Middlesex.  | Boston.          | Lawrence.            | End of 1897 lay-out.                     | Southerly.      | .61                 | Sandy gravel.           | Sand and gravel.                    | 65        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 2.67                          | C. H. Kelleher of Newburyport.  | Work not started.  |
| Norwood.              | 1895, '96.      | Norfolk.    | Boston.          | Providence.          | Hills station.                           | Southerly.      | 1.92                | Gravel.                 | Gravelly.                           | 40-50-67  | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 5.21                          | Town of Norwood.  | Street railway on side.  |
| Norwood.              | 1897.           | Norfolk.    | Boston.          | Providence.          | Walpole line.                            | Northerly.      | .81                 | Hard-pau and gravel.    | Hard-pau and ledge.                 | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 1.25                          | Town of Norwood.  |  |
| Orange.               | 1891, '95, '97. | Franklin.   | Boston.          | Williamstown.        | Athol line.                              | Westerly.       | 2.18                | Gravel.                 | Sand and gravel.                    | 30-19-6   | 17       | 3-4        | Gravel.                                    | Broken stone.                    | Local stone base, Waltham trap top.                       | 5.00                          | Town of Orange.   |  |
| Paxton.               | 1895-'01.       | Worcester.  | Worcester.       | Athol.               | Worcester line.                          | North-westerly. | 2.61                | Sandy gravel.           | Loam and clay.                      | 50-70     | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 1.00                          | Town of Paxton.   |  |
| Paxton.               | 1898.           | Worcester.  | Worcester.       | Athol.               | End of 1897 lay-out.                     | North-westerly. | .60                 | Clayey sand and gravel. | Clay, sand and sandy gravel.        | 70-65     | 15       | 3-5        | Gravel.                                    | Broken stone.                    | Local field stone.  | 2.18                          | Town of Paxton.   |  |
| Phillipston.          | 1897.           | Worcester.  | Boston.          | Williamstown.        | Athol line.                              | Easterly.       | .50                 | Sandy.                  | Sandy.                              | 50        | 15       | 3          | Sandy gravel.                              | Broken stone.                    | Local field stone.  | 1.00                          | Fred E. Ellis of Melrose.   |  |
| Phillipston.          | 1898.           | Worcester.  | Boston.          | Williamstown.        | End of 1897 lay-out.                     | Easterly.       | .69                 | Sandy.                  | Sandy.                              | 50        | 12       | 1          | Sandy gravel.                              | Broken stone.                    | Local field stone.  | 8.00                          | J. J. Welch & Co. of Salem.   |  |
| Pittsfield.           | 1894.           | Berkshire.  | Boston.          | New York line.       | Hancock line.                            | Easterly.       | 1.00                | Gravel.                 | Gravelly.                           | 30        | 15       | 3          | Gravel.                                    | Broken stone.                    | West Springfield trap.                                    | 1.25                          | City of Pittsfield.   |  |
| Pittsfield.           | 1897.           | Berkshire.  | Boston.          | New York line.       | Danforth line.                           | Westerly.       | .76                 | Gravel.                 | Gravel.                             | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | Westfield trap.   | 5.50                          | M. R. Fisk of Huntington.   | Street railway on side.  |
| Pittsfield.           | 1898.           | Berkshire.  | Boston.          | New York line.       | End of 1894 lay-out.                     | Easterly.       | .38                 | Gravel and clay.        | Clay.                               | 50-60     | 15       | 3          | Gravel.                                    | Broken stone.                    | Westfield trap.   | 6.35                          | Harries & Letteney of Boston.   | Slopes and shoulders not finished.   |
| Plymouth.             | 1894-'97.       | Plymouth.   | Boston.          | Provincetown.        | Beaver Dam Brook.                        | (Southerly.)    | 3.56                | Sand, loam, gravel.     | Sand, sandy loam.                   | 10-50-112 | 15       | 3          | Gravel.                                    | Broken stone; 1891, grading.     | Local stone; 1897, grading.                               | 5.50                          | 1891-'95, Town of Plymouth; 1896, grading, Andrew Carberry, East Walpole. | 1895 lay-out, stone arch bridge built, 12 foot span; 1897 lay-out, grade reduced from 10 to 5.5 per cent.          |
| Plymouth.             | 1898.           | Plymouth.   | Boston.          | Provincetown.        | End of 1897 lay-out.                     | (Northerly.)    | .30                 | Sandy gravel, loam.     | Sand, sandy loam.                   | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 1.00                          | Nicholas White of Medford.  |  |
| Princeton.            | 1897.           | Worcester.  | Worcester.       | Gardner.             | Princeton station.                       | Easterly.       | .49                 | Gravel.                 | Clay.                               | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 2.70                          | Town of Princeton.  |  |
| Rehoboth.             | 1893, '95.      | Bristol.    | Taunton.         | Providence.          | Seekonk line.                            | Easterly.       | 1.55                | Sandy loam.             | Sandy loam.                         | 65        | 15       | 3          | Gravel and sandy loam.                     | Broken stone.                    | Local field stone and boulders.                           | 1.30                          | Town of Rehoboth.   |  |
| Rehoboth.             | 1897, '98.      | Suffolk.    | Boston.          | Newburyport.         | Richmond line.                           | North-easterly. | .58                 | Clayey gravel.          | Clayey gravel.                      | 11-60     | 21       | 3          | Gravel.                                    | Broken stone.                    | Salem trap.   | 2.50                          | A. J. Wellington of Boston; T. Stuart & Sons of Newton.                   | Roadway raised and widened.  |
| Richmond.             | 1897.           | Berkshire.  | Richmond.        | Richmond.            | Richmond Furnace.                        | Northerly.      | .47                 | Clay, gravel.           | Clay and hard-pau.                  | 65        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 6.00                          | Town of Richmond.   |  |
| Richmond.             | 1898.           | Berkshire.  | Richmond.        | Richmond.            | End of 1897 lay-out.                     | Northerly.      | .56                 | Clay and gravel.        | Clay and hard-pau.                  | 65        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 8.50                          | Town of Richmond.   | Not finished.  |
| Russell (Fairfield).  | 1894-'97.       | Hampden.    | Boston.          | New York line.       | Westfield line.                          | Westerly.       | 3.48                | Sandy gravel.           | Sandy gravel.                       | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | 1894, Westfield trap; 1896, '97, gravel.                  | 5.50                          | Town of Russell.  | 1891 lay-out, stone arch bridge built, 15 foot span; 1895-'97 lay-out, gravel 15 feet wide, shoulders 3 feet wide. |
| Russell (Fairfield).  | 1898.           | Hampden.    | Boston.          | New York line.       | End of 1897 lay-out.                     | Westerly.       | .63                 | Sandy gravel.           | Sandy gravel.                       | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | West Springfield trap.                                    | 5.00                          | Town of Russell.  | Not finished.  |
| Russell (Huntington). | 1891, '95.      | Hampden.    | Boston.          | New York line.       | Huntington line.                         | Easterly.       | .81                 | Gravel and loam.        | Gravelly.                           | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | West Springfield trap.                                    | 5.00                          | Town of Russell.  | Not finished.  |
| Russell (Huntington). | 1898.           | Hampden.    | Boston.          | New York line.       | End of 1895 lay-out.                     | South-easterly. | .41                 | Gravel and loam.        | Loamy gravel.                       | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | West Springfield trap.                                    | 1.00                          | Town of Russell.  | Not finished.  |
| Sandwich.             | 1897.           | Barnstable. | Boston.          | Provincetown.        | Barnstable line.                         | North-westerly. | 1.00                | Clay and sandy gravel.  | Sandy.                              | 50        | 15       | 3          | Sandy loam.                                | Broken stone.                    | Local field stone.  | 1.35                          | Town of Sandwich.   |  |
| Sandwich.             | 1898.           | Barnstable. | Boston.          | Provincetown.        | End of 1897 lay-out.                     | Westerly.       | .83                 | Clay and sandy gravel.  | Sandy.                              | 50        | 15       | 3          | Sandy loam.                                | Broken stone.                    | Local field stone.  | 3.21                          | Town of Sandwich.   |  |
| Scituate.             | 1894, '95.      | Plymouth.   | Boston.          | Provincetown.        | North Scituate station.                  | South-easterly. | 1.17                | Sandy gravel.           | Sandy loam, many boulders.          | 39        | 15       | 2          | Sandy gravel.                              | Broken stone.                    | From North Cobasset quarry and local field stone.         | 5.00                          | Town of Scituate.   |  |
| Shelburne.            | 1894-'97.       | Franklin.   | Shelburne Falls. | Shelburne Falls.     | Bridges Street.                          | North-easterly. | 2.16                | Sandy gravel.           | Sand, loam, hard-pau.               | 30-50     | 18-15    | 3          | Two inches broken stone.                   | Broken stone.                    | 1894-96, river and field stone; 1897, Westfield trap.     | 3.10                          | Town of Shelburne.  |  |
| Shrewsbury.           | 1895-'97.       | Worcester.  | Boston.          | New York line.       | Worcester line.                          | North-easterly. | 2.40                | Gravel.                 | Sandy loam, clay and gravel.        | 50        | 18-15    | 3-4        | Gravel.                                    | Broken stone.                    | Local stone.  | 6.11                          | Town of Shrewsbury.   | 1897, street railway lowered to conform to highway grade.  |
| Shrewsbury.           | 1898.           | Worcester.  | Boston.          | New York line.       | End of 1897 lay-out.                     | Easterly.       | .61                 | Gravel and clay.        | Clay and loam.                      | 50-65     | 15       | 3-1        | Gravel.                                    | Broken stone.                    | Local stone.  | 6.11                          | Town of Shrewsbury.   | Highway track on south side.   |
| Spencer.              | 1895-'01.       | Dorset.     | Boston.          | South Street.        | South Street.                            | Southerly.      | 2.05                | Gravel.                 | Sandy loam, clayey gravel.          | 16-18     | 15       | 3          | Material and gravel from old road surface. | Broken stone.                    | Local stone.  | 5.00                          | Town of Spencer.  | Highway track on south side.   |
| South Hadley.         | 1893, '97.      | Hampshire.  | Holyoke.         | Worcester County.    | Granby line.                             | South-westerly. | .92                 | Sand.                   | Sandy.                              | 35-74     | 15       | 3          | Sandy gravel.                              | Broken stone.                    | 1895, Westfield trap; 1897, Deerfield trap.               | 3.15                          | 1895, Fred T. Ley & Co. of Springfield; 1897, Town of South Hadley.       | Highway track on east side.  |
| South Hadley.         | 1898.           | Hampshire.  | Holyoke.         | Worcester County.    | End of 1897 lay-out.                     | South-westerly. | .57                 | Sand.                   | Sandy.                              | 50        | 15       | 3          | Sandy gravel.                              | Broken stone.                    | Westfield trap.   | 2.42                          | Amos D. Hildge of Hazardville, Conn.                                      |  |
| Spencer.              | 1897.           | Worcester.  | Boston.          | New York line.       | Leicester line.                          | Westerly.       | .43                 | Sandy gravel.           | Clay.                               | 50        | 15       | 1-3        | Gravel.                                    | Broken stone.                    | Local field stone.  | 1.85                          | Town of Spencer.  | Highway tracks to be relocated to north side.  |
| Sterling.             | 1897.           | Worcester.  | Fitchburg.       | Fitchburg.           | New Town Hall.                           | South-westerly. | .76                 | Gravel.                 | Gravel.                             | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local trap.   | 2.80                          | Town of Sterling.   |  |
| Sterling.             | 1898.           | Worcester.  | Worcester.       | Fitchburg.           | End of 1897 lay-out.                     | South-westerly. | .53                 | Gravel.                 | Gravel.                             | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local trap.   | 2.04                          | Town of Sterling.   |  |
| Stoughton.            | 1897.           | Middlesex.  | Boston.          | Lawrence.            | South Street.                            | Northerly.      | .14                 | Gravel.                 | Loam, gravel, ledge.                | 60        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local stone.  | 5.00                          | Fred E. Ellis of Melrose.   |  |
| Stoughton.            | 1898.           | Middlesex.  | Boston.          | Lawrence.            | End of 1897 lay-out to Marlboro Street.  | Northerly.      | .13                 | Gravel.                 | Loam, gravel, ledge.                | 60        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local stone.  | 5.00                          | Fred E. Ellis of Melrose.   |  |
| Sturbridge.           | 1897.           | Worcester.  | Palmer.          | Connecticut line.    | Park Hill road.                          | Northerly.      | .68                 | Sandy gravel.           | Sand and clay.                      | 50        | 15       | 1-2        | Gravel.                                    | Broken stone.                    | Local stone.  | 1.18                          | Bowlen & Whitaker of Sturbridge.  | Street railway on south side.  |
| Sudbury.              | 1897.           | Middlesex.  | Boston.          | New York line.       | Marlborough line.                        | Easterly.       | .55                 | Clayey gravel.          | Clayey gravel, sand.                | 50-60     | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 3.10                          | A. J. Wellington of Boston.   |  |
| Sunderland.           | 1898.           | Middlesex.  | Boston.          | New York line.       | End of 1897 lay-out.                     | Easterly.       | .49                 | Gravel.                 | Clayey sand, sand, ledge, boulders. | 50-60     | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 4.10                          | White & Gaffey of Medford.  |  |
| Swampscott.           | 1897.           | Franklin.   | Amherst.         | Conway and Buckland. | Connecticut River.                       | Easterly.       | .49                 | Hard sand-stone.        | Sand.                               | 70-80     | 15       | 3          | Material from old road surface.            | Broken stone.                    | Deerfield trap.   | 2.50                          | Town of Sunderland.   | Not finished.  |
| Swampscott.           | 1897.           | Franklin.   | Boston.          | Newburyport.         | Boston & Maine R.R. (Marblehead branch). | North-easterly. | 1.03                | New road.               | Loam, ledge, gravel.                | 60        | 15       | 3          | Graded only.                               | Graded only.                     | Deerfield trap.   | 5.00                          | Tuttle & Edgerly of Swampscott.   |  |
| Taunton.              | 1895, '96.      | Bristol.    | Taunton.         | Providence.          | Near Highland Street.                    | Westerly.       | 1.20                | Gravel.                 | Sand and gravel.                    | 18-65     | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 3.00                          | City of Taunton.  |  |
| Taunton.              | 1898.           | Bristol.    | Taunton.         | Providence.          | End of 1896 lay-out.                     | Westerly.       | .60                 | Gravel.                 | Sand and gravel.                    | 60        | 15       | 3          | Gravel.                                    | Broken stone.                    | Local field stone.  | 3.00                          | City of Taunton.  |  |
| Tisbury.              | 1894.           | Dukes.      | Vineyard Haven.  | Vineyard Haven.      | Vineyard Haven Village.                  | South-westerly. | 1.93                | Sand and loam.          | Loose sand and loam.                | 50        | 15       | 3          | Gravel.                                    | Broken stone.                    | Field stone.  | 1.10                          | Town of Tisbury.  |  |
| Townsend.             | 1896, '97.      | Middlesex.  | Boston.          | New Hampshire line.  | Near Townsend harbor.                    | North-westerly. | 1.12                | Sandy gravel.           | Sandy gravel, sand.                 | 60        | 15       | 3          | Sand and stone dust.                       | Broken stone.                    | Local field stone.  | 1.00                          | Fred E. Ellis of Melrose.   | \$4,000 appropriated by town expended under direction of commission.   |
| Townsend.             | 1898.           | Middlesex.  | Boston.          | New Hampshire line.  | End of 1897 lay-out.                     | North-westerly. | .66                 | Sandy gravel.           | Sandy gravel, sand.                 | 55-60     | 15       | 3          | Sand and stone dust.                       | Broken stone.                    | Local field stone.  | 1.40                          | C. H. Kelleher of Newburyport.  |  |
| Tyngsborough.         | 1895, '96.      | Middlesex.  | Boston.          | Nashua, N. H.        | Wellfleet line.                          | Northerly.      | 2.36                | Sand.                   | Sand.                               | 10        | 15       | 3          | Gravel.                                    | Broken stone.                    | Cobasset quarry.  | 6.00                          | A. J. Wellington of Boston; Chas. Snow of Fram.                           | Heavy cuts to reduce grades; 1.23 miles graded and surfaced with gravel and broken stone.                          |
| Tyngsborough.         | 1895, '96.      | Middlesex.  | Boston.          | Nashua, N. H.        | Tyngsborough line.                       | South-easterly. | 2.95                | Sand and loam.          | Sand and loam.                      | 60        | 15       | 3          | Gravel.                                    | Broken stone.                    | 1895, Salem trap; 1896, local stone base, Salem trap top. | 1.80                          | Town of Tyngsborough.   | Location graded by county commissioners of Middlesex County, surfaced by Highway Commission.                       |

Variable widths.

Gravel laid 21 feet in cuts, 25 feet on embankment.

1895-'97 lay-outs, northerly.

2.53 miles macadamized; 1.03 miles graded.

1896 and 1897 lay-outs, shoulders gravel.



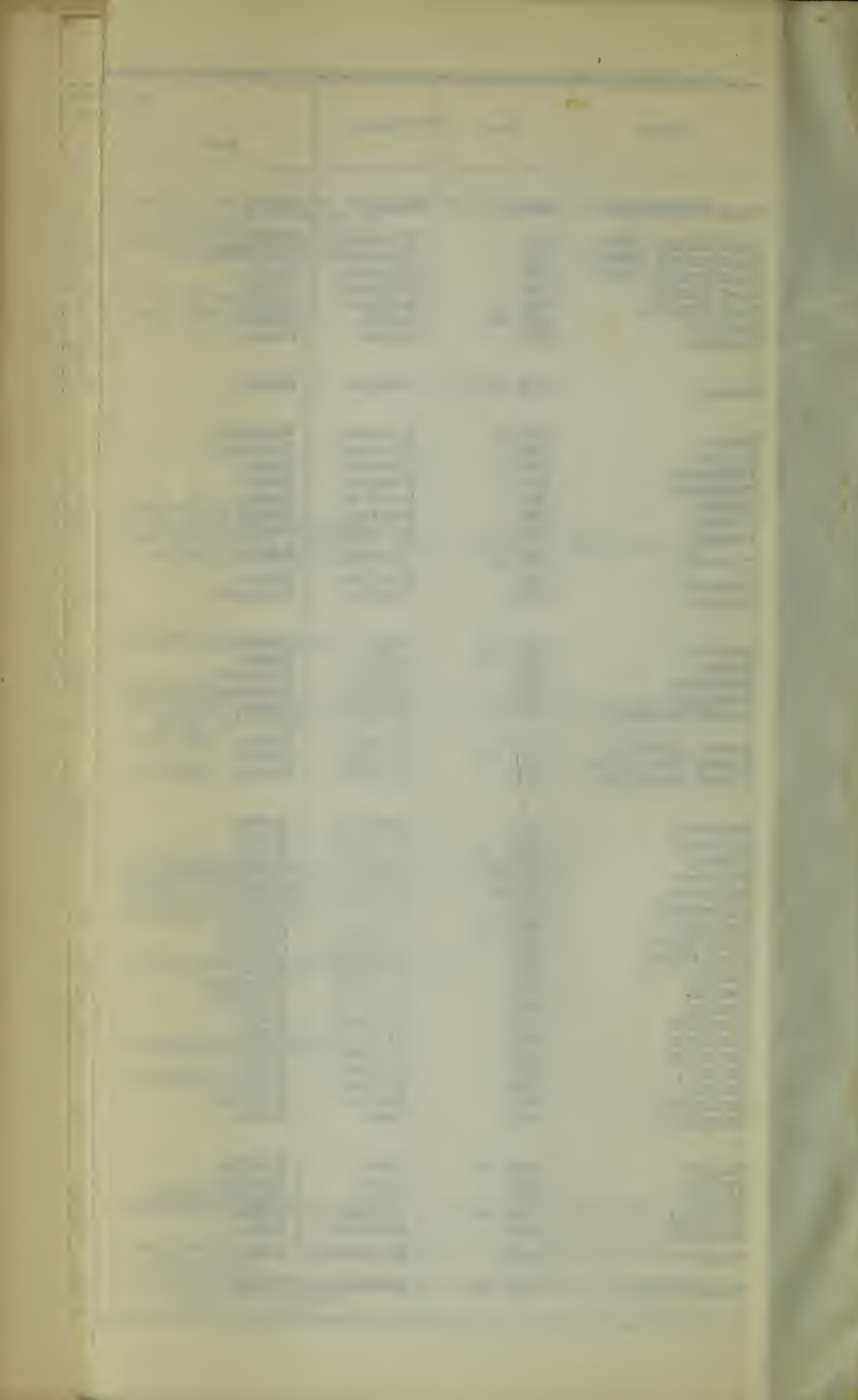


Table showing the highways constructed or contracted for by the commission, and the nature of the several constructions, to Jan. 1, 1899.

| TOWNS.      | Year.      | County.     | MAIN VAS.                |                         | ROAD Laid OUT.                          |                 | Length. |              | CHARACTER OF —              |                           | WIDTH.    |          | MATERIAL USED IN CONSTRUCTION OF — |   | Maximum Price Paid per Cub. Yd. | Contractor.   | Remarks.  |
|-------------|------------|-------------|--------------------------|-------------------------|---|-----------------|---------|--------------|-----------------------------|---------------------------|-----------|----------|------------------------------------|---|---------------------------------|---|---|
|             |            |             | From —                   | To —                    | From —                                  | Direction.      | Miles.  | Constructed. | Old Road.                   | Natural Soil.             | Location. | Macadam. | Shoulders.                         | Kind of Broken Stone.                                     |                                 |   |   |
| Acushnet.   | 1897.      | Bristol.    | New Bedford.             | Boston (ohl main road). | 1,500 feet east from New Bedford line.  | Northerly.      | .63     | .63          | Gravel.                     | Sandy loam.               | 60+1      | 15       | 3                                  | Material from old road surface.                           | Broken stone.                   | Local field stone.  | Town of Acushnet.   |
| Adams.      | 1897.      | Berkshire.  | Pittsfield.              | North Adams.            | Cheshire line.                          | Northerly.      | .67     | .67          | Gravel.                     | Sandy gravel.             | 60        | 15       | 3                                  | West Springfield trap.                                    | Broken stone.                   | Geo. Shand of Adams.  | Iron bridge, solid floor.   |
| Andover.    | 1895, '96. | Essex.      | Lawrence.                | Boston.                 | Lawrence line.                          | Southerly.      | 1.22    | 1.22         | Gravel surface.             | Loose sand and gravel.    | 60        | 15       | 3                                  | 1895, local stone base, Salem trap top; 1896, Salem trap. | Broken stone.                   | 1895, Town of Andover; 1896, A. J. Wellington of Boston.  | Street railway within location at one side.   |
| Andover.    | 1897.      | Essex.      | Lawrence.                | Boston.                 | North Middlesex line.                   | Northerly.      | .18     | .18          | Sandy gravel, some clay.    | Sandy gravel, some clay.  | 60        | 15       | 3                                  | Local field stone.  | Broken stone.                   | Town of Andover.  |   |
| Asbury.     | 1894-97.   | Middlesex.  | Fitchburg.               | New Hampshire line.     | Asbury post-office.                     | Southerly.      | 2.46    | 2.46         | Gravel and loam, some sand. | Sandy gravel, some clay.  | 66-60     | 20-18-15 | 3                                  | Local field stone.  | Broken stone.                   | Town of Asbury.   | Relocation of part to reduce grade; wooden bridge of 31 foot span built over Willard's brook. |
| Ashby.      | 1896.      | Middlesex.  | Fitchburg.               | New Hampshire line.     | End of 1897 lay-out.                    | Southerly.      | .68     | .36          | Gravel and loam.            | Gravel, loam, some ledge. | 50        | 15       | 3                                  | Gravel.   | Broken stone.                   | Local field stone.  | Town of Ashby.  |
| Ashfield.   | 1897.      | Franklin.   | Shelburne Falls.         | Ashfield.               | One mile north of Ashfield post-office. | Northerly.      | .71     | .71          | Sand and loam.              | Sandy loam, boulders.     | 70        | Graded.  | —                                  | —   | —                               | Keene & Foster of Boston.   | New location being graded.  |
| Ashfield.   | 1898.      | Franklin.   | Shelburne Falls.         | Ashfield.               | End of 1897 lay-out.                    | Northerly.      | .87     | .46          | Sand and loam.              | Sandy loam, boulders.     | 50-70     | Graded.  | —                                  | —   | —                               | Walsh, Bolder and Iron Works; Tuttle & Edgely; Joseph H. Genaro, grading.                                     | Plate girder bridge, 35 foot span.  |
| Attol.      | 1891, '96. | Worcester.  | Boston.                  | Williamstown.           | Orange line.                            | Easterly.       | 1.64    | 1.61         | Gravel.                     | Gravelly.                 | 50        | 17       | 3                                  | Gravel.   | Broken stone.                   | Lower course red granite, upper course Waltham trap.  | Town of Attol.  |
| Attol.      | 1895-97.   | Worcester.  | Worcester.               | Connecticut line.       | Dani's mill.                            | Southerly.      | 1.93    | 1.93         | Gravel and loam.            | Gravel and loam.          | 50        | 16       | 3                                  | Gravel.   | Broken stone.                   | 1895, West Springfield trap; 1896, '97, local field stone.  | Town of Attol.  |
| Attol.      | 1898.      | Worcester.  | Worcester.               | Connecticut line.       | Worcester line.                         | Southerly.      | .14     | .20          | Gravel and loam.            | Gravel and loam.          | 50        | 18       | 3                                  | Gravel.   | Broken stone.                   | Danielsonville, Conn., trap.  | Town of Attol.  |
| Barnstable. | 1897.      | Barnstable. | Falmouth.                | Chatham.                | Yarmouth line.                          | Westerly.       | .83     | .83          | Loamy gravel.               | Sand and sandy loam.      | 10+1      | 18-15    | 3                                  | Loamy gravel.   | Broken stone.                   | Local field stone from north side.  | A. J. Wellington of Boston.   |
| Barre.      | 1897.      | Worcester.  | Worcester.               | Chatham.                | Bridge over Ware River.                 | Westerly.       | .67     | .67          | Clay and gravel.            | Clay and gravel.          | 19-15     | 15       | 3                                  | Gravel.   | Broken stone.                   | West Springfield trap.  | Thos. Hennessey of Hohen.   |
| Bedford.    | 1897.      | Middlesex.  | Dorchester.              | New Hampshire line.     | Lexington line.                         | North-westerly. | .65     | .65          | Sand and gravel.            | Sand and gravel.          | 50        | 15       | 3                                  | Gravel.   | Broken stone.                   | Local field stone from Lexington.   | Wm. H. Magne of Newtow.   |
| Beverly.    | 1895, '97. | Essex.      | Boston.                  | Newburyport.            | Wenham line.                            | Southerly.      | 1.53    | 1.53         | Gravel.                     | Gravelly.                 | 50-60     | 18       | 3                                  | Gravel.   | Broken stone.                   | Local trap.   | City of Beverly.  |
| Beverly.    | 1895.      | Essex.      | Boston.                  | Newburyport.            | End of 1897 lay-out.                    | Southerly.      | .83     | .83          | Gravel.                     | Clayey sand and gravel.   | 50        | 18       | 3                                  | Gravel.   | Broken stone.                   | Local ledge.  | City of Beverly.  |
| Beverly.    | 1897.      | Barnstable. | Pall River.              | Cape Cod.               | Coldest Narrows.                        | Southerly.      | .35     | .35          | Shells, clinkers, loam.     | Sand, clinkers, loam.     | 60+1      | 15       | 3                                  | Material from old road surface.                           | Broken stone.                   | From North Cohasset quarries.   | Wm. H. Magne of Newtow.   |
| Beverly.    | 1897.      | Barnstable. | Pall River.              | Cape Cod.               | End of 1897 lay-out.                    | Easterly.       | 1.07    | .90          | Loamy gravel.               | Sand and sandy gravel.    | 12        | 15       | 3                                  | From old road, sandy gravel.                              | Broken stone.                   | Local field stone and boulders.   | Town of Beverly.  |
| Beverly.    | 1897.      | Middlesex.  | Williamstown.            | Acton line.             | Acton line.                             | Westerly.       | .68     | .76          | Gravel.                     | Gravel.                   | 60        | 15       | 3                                  | Gravel.   | Broken stone.                   | Local stone.  | Town of Beverly.  |
| Beverly.    | 1897.      | Barnstable. | Dorchester.              | Province town.          | Dennis line.                            | Easterly.       | 2.18    | 2.18         | Sand, clay and loam.        | Sand and clay.            | 10-20     | 15       | 3                                  | Gravel, sandy.  | Broken stone.                   | Local field stone.  | Town of Beverly.  |
| Beverly.    | 1897.      | Hampden.    | Taunton.                 | Connecticut line.       | Palmer line.                            | Southerly.      | 1.17    | 1.17         | Sandy gravel.               | Sandy gravel.             | 50        | 15       | 3                                  | Sandy gravel.   | Screened gravel.                | Local stone.  | A. J. Wellington of Boston.   |
| Beverly.    | 1897.      | Plymouth.   | Brookton.                | Taunton.                | Taunton.                                | Westerly.       | .73     | .73          | Gravel.                     | Gravel.                   | 30        | 15       | 3                                  | Gravel.   | Broken stone.                   | Local stone.  | City of Brookton.   |
| Beverly.    | 1897.      | Plymouth.   | Brookton.                | Taunton.                | End of 1897 lay-out.                    | Westerly.       | .39     | .25          | Gravel and hard-pan.        | Gravel and hard-pan.      | 35        | 10       | 3                                  | From old road bed.  | Broken stone.                   | Local stone.  | City of Brookton.   |
| Beverly.    | 1897.      | Worcester.  | Boston.                  | Springfield.            | Mill Street.                            | Easterly.       | .56     | .56          | Clay.                       | Clay.                     | 60        | 15       | 3                                  | Gravel.   | Broken stone.                   | Westfield trap.   | Town of Brookfield.   |
| Beverly.    | 1897.      | Worcester.  | Boston.                  | Springfield.            | End of 1897 lay-out.                    | Easterly.       | .32     | .32          | Gravel.                     | Gravel and loam.          | 50        | 15       | 3                                  | Gravel.   | Broken stone.                   | Westfield trap.   | Town of Brookfield.   |
| Beverly.    | 1897.      | Franklin.   | Shelburne Falls station. | Ashfield.               | Shelburne Falls station.                | North-westerly. | 2.16    | 2.16         | Gravel.                     | Sandy loam.               | 30-50     | 21-18-15 | 3                                  | Gravel.   | Broken stone.                   | 1894, '95, red granite base, Waltham trap top; 1896, Westfield trap; 1897, Westfield trap, some Waltham trap. | Town of Brookland.  |
| Beverly.    | 1897.      | Franklin.   | Shelburne Falls station. | Ashfield.               | End of 1897 lay-out.                    | Westerly.       | .36     | .27          | Gravel.                     | Gravel and hard-pan.      | 50        | 12       | 3                                  | Gravel.   | Broken stone.                   | Westfield trap.   | Town of Brookland.  |
| Beverly.    | 1897.      | Franklin.   | Shelburne Falls station. | Ashfield.               | End of 1897 lay-out.                    | Westerly.       | .36     | .27          | Gravel.                     | Gravel and hard-pan.      | 50        | 12       | 3                                  | Gravel.   | Broken stone.                   | Westfield trap.   | Town of Brookland.  |
| Beverly.    | 1897.      | Franklin.   | Shelburne Falls station. | Ashfield.               | End of 1897 lay-out.                    | Westerly.       | .36     | .27          | Gravel.                     | Gravel and hard-pan.      | 50        | 12       | 3                                  | Gravel.   | Broken stone.                   | Westfield trap.   | Town of Brookland.  |
| Charlemont. | 1897.      | Franklin.   | Boston.                  | Williamstown.           | Bridge over Deerfield River.            | Easterly.       | .30     | .39          | Gravel.                     | Gravel and loam.          | 45+1      | 15       | 3                                  | Gravel.   | Broken stone.                   | Red granite base, Waltham trap top.   | Town of Charlemont.   |
| Charlemont. | 1898.      | Franklin.   | Boston.                  | Williamstown.           | End of 1897 lay-out.                    | Easterly.       | .25     | .22          | Gravel and clay.            | Gravel and clay.          | 50        | 15       | 3                                  | Gravel.   | Broken stone.                   | Red granite base, Waltham trap top.   | Town of Charlemont.   |
| Chelmsford. | 1898.      | Middlesex.  | Lowell.                  | New Hampshire line.     | Lowell line.                            | Westerly.       | .82     | .82          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | Springfield line.                       | Northerly.      | .58     | .58          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     | 50+1      | 20       | 1-3                                | Gravel.   | Broken stone.                   | Westfield trap.   | City of Chelmsford.   |
| Chelmsford. | 1897.      | Hampden.    | Springfield.             | Holyoke.                | End of 1897 lay-out.                    | Northerly.      | .29     | .29          | Gravel surface over clay.   | Clay.                     |           |          |                                    |   |                                 |   |   |



the southerly end to 16 feet at the northerly end, the ground rising on the sides where the settlement was greatest.

Hay had been cut from this meadow for years, and persons who had driven over it had never noticed any peculiar action of the land. The depression was evidently caused by a submerged spring, which kept the material at the bottom in a fluid state, while at the surface the material solidified sufficiently to sustain the loads that passed over it.

Included in the expenses for engineering is the cost of the survey for the highway from Beverly to Rockport, the Salem Turnpike, and at Brimfield, where no construction work has been done; for resident engineers on town roads constructed in Nantucket, Pepperell and Westborough; and for surveys and plans for bridges at Charlemont, Townsend and Russell, built by these towns.

The accompanying table, in which the figures given are in feet, shows the maximum width of the travelled way and the width commonly used for travel on the different roads.

Respectfully submitted,

CHARLES MILLS,  
*Chief Engineer.*



TABLE SHOWING WIDTHS OF TRAVELLED WAY.

| TOWN OR CITY.           | County.       | Width<br>of<br>Macadam. | MAXIMUM WIDTH<br>OF TRAVELLED<br>WAY. |       |       | WIDTH OF COM-<br>MONLY TRAVELLED<br>WAY. |       |       |
|-------------------------|---------------|-------------------------|---------------------------------------|-------|-------|--|-------|-------|
|                         |               |                         | 1896.                                 | 1897. | 1898. | 1896.                                    | 1897. | 1898. |
| Acushnet, . . .         | Bristol, .    | 15                      | -                                     | 15    | 13    | -  | 12    | 9     |
| Adams, . . .            | Berkshire, .  | 15                      | -                                     | -     | 11    | -  | -     | 7     |
| Andover,* . . .         | Essex, . .    | 18                      | 24                                    | 24    | 24    | 24                                       | 20    | 16    |
| Andover,† . . .         | Essex, . .    | 15                      | -                                     | -     | 11    | -  | -     | 8     |
| Ashby, . . .            | Middlesex, .  | 15-20                   | 12                                    | 12    | 12    | 9  | 9     | 9     |
| Ashfield, . . .         | Franklin, .   | Graded,                 | -                                     | -     | 16    | -  | -     | 10    |
| Athol, . . .            | Worcester, .  | 17                      | 16                                    | 16    | 20    | 10-12                                    | 12    | 14    |
| Auburn, . . .           | Worcester, .  | 15                      | 12                                    | 13    | 14    | 9  | 9     | 10    |
| Barnstable, . . .       | Barnstable, . | 15-18                   | -                                     | -     | 21    | -  | -     | 12    |
| Barre, . . .            | Worcester, .  | 15                      | -                                     | 13    | 14    | -  | 9     | 7     |
| Bedford, . . .          | Middlesex, .  | 15                      | -                                     | 12    | 15    | -  | 8     | 10    |
| Beverly, . . .          | Essex, . .    | 18                      | 20-24                                 | 22    | 24    | 20                                       | 16    | 15    |
| Bourne, . . .           | Barnstable, . | 15                      | -                                     | 10    | 18    | -  | 8     | 9     |
| Boxborough, . . .       | Middlesex, .  | 15                      | -                                     | 12    | 13    | -  | 8     | 10    |
| Brewster, . . .         | Barnstable, . | 15                      | -                                     | 12    | 12    | -  | 9     | 9     |
| Brimfield, . . .        | Hampden, .    | Screened<br>gravel.     | -                                     | -     | 11    | -  | -     | 8     |
| Brockton, . . .         | Plymouth, .   | 16                      | -                                     | 18    | 12    | -  | 12    | 9     |
| Brookfield, . . .       | Worcester, .  | 15                      | -                                     | 12    | 12    | -  | 9     | 9     |
| Buckland, . . .         | Franklin, .   | 15-24                   | 10                                    | 10    | 15    | 7-9                                      | 8     | 8     |
| Charlemont, . . .       | Franklin, .   | 15-21                   | -                                     | 15    | 15    | -  | 10    | 10    |
| Chelmsford, . . .       | Middlesex, .  | 18                      | -                                     | -     | -     | -  | -     | -     |
| Chicopee, . . .         | Hampden, .    | 20                      | -                                     | 20    | 20    | -  | 12    | 12    |
| Cohasset, . . .         | Norfolk, .    | 15                      | -                                     | -     | 10    | -  | -     | 7     |
| Colrain, . . .          | Franklin, .   | Gravel,                 | -                                     | -     | -     | -  | -     | -     |
| Concord, . . .          | Middlesex, .  | 15                      | -                                     | 15    | 15    | -  | 10    | 10    |
| Cottage City, . . .     | Dukes, .      | 15                      | -                                     | 21    | 10    | -  | 15    | 7     |
| Dalton, . . .           | Berkshire, .  | 15                      | 20                                    | 20    | 21    | 20                                       | 16    | 18    |
| Dartmouth, . . .        | Bristol, .    | 18                      | -                                     | -     | -     | -  | -     | -     |
| Deerfield, . . .        | Franklin, .   | 15                      | 12-14                                 | 14    | 16    | 11                                       | 12    | 12    |
| Dennis, . . .           | Barnstable, . | 15                      | -                                     | 12    | 15    | -  | 9     | 7     |
| Duxbury, . . .          | Plymouth, .   | 15                      | 12-14                                 | 12    | 10    | 7  | 9     | 7     |
| Easthampton, . . .      | Hampshire, .  | 15                      | 12-13                                 | 12    | 14    | 9-10                                     | 10    | 10    |
| Edgartown, . . .        | Dukes, .      | 15                      | -                                     | 21    | 10    | -  | 15    | 7     |
| Erving, . . .           | Franklin, .   | Gravel,                 | -                                     | -     | -     | -  | -     | -     |
| Fairhaven, . . .        | Bristol, .    | 15                      | -                                     | 18    | 18    | -  | 12    | 10    |
| Fitchburg (East), . . . | Worcester, .  | 18                      | -                                     | -     | 18    | -  | -     | 15    |

\* 1895 and 1896 lay-outs.

† 1897 lay-out.



TABLE SHOWING WIDTHS OF TRAVELLED WAY — *Continued.*

| TOWN OR CITY.                          | County.      | Width<br>of<br>Macadam. | MAXIMUM WIDTH<br>OF TRAVELLED<br>WAY. |       |       | WIDTH OF COM-<br>MONLY TRAVELLED<br>WAY. |       |       |
|--|--------------|-------------------------|---------------------------------------|-------|-------|--|-------|-------|
|  |              |                         | 1896.                                 | 1897. | 1898. | 1896.                                    | 1897. | 1898. |
| Fitchburg (West), .                    | Worcester, . | 15                      | 15                                    | 14    | 18    | 10                                       | 10    | 15    |
| Gardner, . . .                         | Worcester, . | Graded<br>only.<br>15   | -                                     | 12    | 15    | -  | 8     | 10    |
| Gloucester, . . .                      | Essex, . .   |                         | 15                                    | 17    | 18    | 15                                       | 13    | 12    |
| Goshen, . . .                          | Hampshire, . | 15                      | 10                                    | 11    | 10    | 7  | 8     | 7     |
| Grafton, . . .                         | Worcester, . | 15                      | -                                     | 11    | 14    | -  | 9     | 10    |
| Granby, . . .                          | Hampshire, . | 15                      | 9                                     | 14    | 14    | 5  | 10    | 8     |
| Great Barrington, .                    | Berkshire, . | 15                      | -                                     | 25    | 25    | -  | 12    | 14    |
| Great Barrington, .                    | Berkshire, . | Gravel,                 | -                                     | -     | 25    | -  | -     | 11    |
| Greenfield, . . .                      | Franklin, .  | 18                      | -                                     | -     | -     | -  | -     | -     |
| Hadley, . . .                          | Hampshire, . | 15                      | 15-18                                 | 14-17 | 18    | 10                                       | 10    | 10    |
| Hancock, . . .                         | Berkshire, . | Gravel,                 | -                                     | 18    | 11    | -  | 8     | 9     |
| Hardwick, . . .                        | Worcester, . | 15                      | -                                     | -     | 15    | -  | -     | 8     |
| Hingham,* . . .                        | Plymouth, .  | Gravel,                 | 17                                    | 15    | 15    | 10                                       | 9     | 10    |
| Hingham,† . . .                        | Plymouth, .  | 15                      | -                                     | 10    | 10    | -  | 8     | 7     |
| Holbrook, . . .                        | Norfolk, .   | 15                      | -                                     | 12    | 9     | -  | 8     | 7     |
| Holden, . . .                          | Worcester, . | 15-18                   | 13-18                                 | 11    | 14    | 10                                       | 9     | 10    |
| Huntington, . . .                      | Hampshire, . | 15                      | 9                                     | 11    | 11    | 7  | 8     | 9     |
| Lawrence, . . .                        | Essex, . .   | 18                      | -                                     | 21    | 21    | -  | 17    | 16    |
| Lee, . . .                             | Berkshire, . | 15-24                   | 15-21                                 | 17    | 19    | 12-15                                    | 11    | 13    |
| Leicester, . . .                       | Worcester, . | 15-18-24                | 15                                    | 20    | 25    | 10-12                                    | 12    | 15    |
| Lexington, . . .                       | Middlesex, . | 15                      | 15-20                                 | 16    | 15    | 15                                       | 12    | 10    |
| Lincoln, . . .                         | Middlesex, . | 15                      | 15                                    | 15    | 15    | 10                                       | 9     | 10    |
| Lowell (North), . .                    | Middlesex, . | 15                      | -                                     | 15-25 | 25    | -  | 9-12  | 10    |
| Lowell (South), . .                    | Middlesex, . | 18                      | -                                     | 18    | 20    | -  | 12    | 12    |
| Lunenburg, . . .                       | Worcester, . | 15                      | -                                     | -     | -     | -  | -     | -     |
| Marion,‡ . . .                         | Plymouth, .  | 15                      | 15                                    | 18    | 15    | 10                                       | 9     | 10    |
| Marion,§ . . .                         | Plymouth, .  | 15                      | -                                     | 12    | 15    | -  | 9     | 10    |
| Marlborough (North-<br>borough), . . . | Middlesex, . | 15                      | -                                     | -     | 14    | -  | -     | 10    |
| Marlborough (Sudbury),                 | Middlesex, . | 15                      | -                                     | -     | 12    | -  | -     | 10    |
| Marshfield, . . .                      | Plymouth, .  | 15                      | 14                                    | 12    | 11    | 8  | 9     | 7     |
| Mattapoisett, . . .                    | Plymouth, .  | 15                      | -                                     | 18    | 15    | -  | 12    | 10    |
| Merrimac, . . .                        | Essex, . .   | 15                      | -                                     | 12    | 12    | -  | 9     | 9     |
| Methuen, . . .                         | Essex, . .   | 15                      | -                                     | 15    | 15    | -  | 10    | 12    |
| Middleborough, . .                     | Plymouth, .  | 15                      | 25-30                                 | 21-12 | 21    | 20-25                                    | 21-9  | 10    |
| Monson, . . .                          | Hampden, .   | 15                      | 12                                    | 14    | 15    | 8-10                                     | 10    | 10    |
| Montague, . . .                        | Franklin, .  | 15                      | -                                     | -     | 9     | -  | -     | 7     |
| Nantucket, . . .                       | Nantucket, . | 15                      | -                                     | 21    | 15    | -  | 8     | 7     |

\* 1894 lay-out.

† 1896 and 1897 lay-outs.

‡ 1894 and 1895 lay-outs.

§ 1897 lay-out.

TABLE SHOWING WIDTHS OF TRAVELLED WAY — *Continued.*

| TOWN OR CITY.                   | County.       | Width<br>of<br>Macadam. | MAXIMUM WIDTH<br>OF TRAVELLED<br>WAY. |       |       | WIDTH OF COM-<br>MONLY TRAVELLED<br>WAY. |       |       |
|---------------------------------|---------------|-------------------------|---------------------------------------|-------|-------|--|-------|-------|
|                                 |               |                         | 1896.                                 | 1897. | 1898. | 1896.                                    | 1897. | 1898. |
| New Braintree, . .              | Worcester, .  | 15                      | -                                     | -     | 15    | -  | -     | 8     |
| Newburyport, . .                | Essex, .      | 15                      | 15                                    | 13    | 13    | 8-10                                     | 9     | 10    |
| Norfolk, . . .                  | Norfolk, .    | 15                      | 10                                    | 10    | 9     | 10                                       | 7     | 7     |
| North Adams, . .                | Berkshire, .  | 15                      | 10-12                                 | 13    | 14    | 8-10                                     | 9     | 10    |
| Northampton (Bridge<br>Street). | Hampshire, .  | 20                      | 18                                    | 18    | 18    | 12                                       | 14    | 12    |
| Northampton,* . .               | Hampshire, .  | 15                      | -                                     | 12    | 18    | -  | 10    | 12    |
| North Attleborough,† .          | Bristol, .    | 15-24                   | 15-20                                 | 18    | 21    | 10-15                                    | 15    | 12    |
| North Attleborough,‡ .          | Bristol, .    | Gravel,                 | -                                     | 6     | 8     | -  | 6     | 6     |
| Northborough, . .               | Worcester, .  | 15                      | -                                     | 12    | 14    | -  | 8     | 10    |
| North Reading, . .              | Middlesex, .  | 15                      | -                                     | -     | 11    | -  | -     | 8     |
| Norwood (Ellis end), .          | Norfolk, .    | 15                      | -                                     | 16    | 16    | -  | 10    | 10    |
| Norwood (Walpole end),          | Norfolk, .    | 15                      | -                                     | -     | 12    | -  | -     | 9     |
| Orange, . . . .                 | Franklin, .   | 17                      | 16                                    | 16    | 20    | 10-12                                    | 12    | 15    |
| Paxton, . . . .                 | Worcester, .  | 15                      | 13                                    | 13    | 13    | 9  | 10    | 10    |
| Phillipston, . . .              | Worcester, .  | 15                      | -                                     | -     | 12    | -  | -     | 10    |
| Pittsfield (West), . .          | Berkshire, .  | 15                      | -                                     | 21    | 14    | -  | 12    | 11    |
| Pittsfield (East), . .          | Berkshire, .  | Gravel,                 | -                                     | -     | 25    | -  | -     | 18    |
| Plymouth, . . .                 | Plymouth, .   | 15                      | 15                                    | 12    | 9     | 9  | 8     | 7     |
| Princeton, . . .                | Worcester, .  | 15                      | -                                     | 11    | 12    | -  | 8     | 9     |
| Rehoboth, . . .                 | Bristol, .    | 15                      | 9                                     | 15    | 12    | 9  | 9     | 7     |
| Revere, . . . .                 | Suffolk, .    | 24                      | -                                     | -     | 23    | -  | -     | 15    |
| Richmond, . . .                 | Berkshire, .  | Gravel,                 | -                                     | 16    | 9     | -  | 8     | 7     |
| Russell (Westfield end),        | Hampden, .    | 15                      | 8-10                                  | 11    | 12    | 7  | 7     | 10    |
| Russell (Huntington<br>end).    | Hampden, .    | 15                      | 8-10                                  | 11    | 12    | 7  | 7     | 10    |
| Sandwich, . . .                 | Barnstable, . | 15                      | -                                     | 11    | 9     | -  | 9     | 7     |
| Saugus, . . . .                 | Essex, .      | 20                      | -                                     | -     | -     | -  | -     | -     |
| Scituate, . . .                 | Plymouth, .   | 15                      | 14                                    | 18    | 18    | 8  | 12    | 10    |
| Shelburne, . . .                | Franklin, .   | 15-18                   | 12-15                                 | 12-15 | 20    | 8  | 10    | 12    |
| Shrewsbury, . . .               | Worcester, .  | 15-18                   | 12-18                                 | 18    | 20    | 7-12                                     | 12    | 14    |
| Somerset, . . .                 | Bristol, .    | 15-18                   | 15                                    | 18    | 18    | 9  | 12    | 9     |
| South Hadley, . .               | Hampshire, .  | 15                      | 15                                    | 14    | 14    | 10                                       | 10    | 10    |
| Sterling, . . .                 | Worcester, .  | 15                      | -                                     | 11    | 12    | -  | 7     | 7     |
| Stoneham, . . .                 | Middlesex, .  | 15                      | -                                     | -     | 15    | -  | -     | 10    |
| Sturbridge, . . .               | Worcester, .  | 15                      | -                                     | 11    | 14    | -  | 8     | 12    |
| Sudbury, . . .                  | Middlesex, .  | 15                      | -                                     | -     | 12    | -  | -     | 10    |
| Sunderland, . . .               | Franklin, .   | 15                      | -                                     | -     | 16    | -  | -     | 12    |
| Swampscott, . . .               | Essex, .      | Gravel,                 | -                                     | -     | -     | -  | -     | -     |

\* 1897 lay-out.

† 1894 and 1895 lay-outs.

‡ 1896 and 1897 lay-outs.

TABLE SHOWING WIDTHS OF TRAVELLED WAY—*Concluded.*

| TOWN OR CITY.                           | County.       | Width<br>of<br>Macadam. | MAXIMUM WIDTH<br>OF TRAVELLED<br>WAY. |       |       | WIDTH OF COM-<br>MONLY TRAVELLED<br>WAY. |       |       |
|---|---------------|-------------------------|---------------------------------------|-------|-------|--|-------|-------|
|   |               |                         | 1896.                                 | 1897. | 1898. | 1896.                                    | 1897. | 1898. |
| Taunton, . . .                          | Bristol, .    | 15                      | 20                                    | 20    | 15    | 10-15                                    | 10    | 8     |
| Tisbury, . . .                          | Dukes Co.,    | 15                      | -                                     | 21    | 15    | -  | 15    | 10    |
| Townsend, . . .                         | Middlesex, .  | 15                      | -                                     | 12    | 13    | -  | 8     | 8     |
| Truro, . . . .                          | Barnstable, . | 10                      | -                                     | 6     | 6     | -  | 6     | 6     |
| Tyngsborough, . .                       | Middlesex, .  | 15                      | 10                                    | 12    | 12    | 10                                       | 8     | 9     |
| Uxbridge, . . .                         | Worcester, .  | 15                      | -                                     | -     | 12    | -  | -     | 8     |
| Walpole (Norwood<br>end).               | Norfolk, .    | 15                      | 15                                    | 12    | 12    | 8  | 9     | 9     |
| Walpole (Norfolk end),                  | Norfolk, .    | 15                      | -                                     | 10    | 10    | -  | 7     | 7     |
| Ware, . . . .                           | Hampshire, .  | 15                      | -                                     | -     | 15    | -  | -     | 8     |
| Wareham (Bourne<br>end).                | Plymouth, .   | 15                      | -                                     | 15    | 12    | -  | 10    | 7     |
| Wareham (Marion end),                   | Plymouth, .   | 15                      | -                                     | -     | 12    | -  | -     | 7     |
| Warren, . . .                           | Worcester, .  | 15                      | 13                                    | 12    | 12    | 7  | 9     | 9     |
| Watertown, . . .                        | Middlesex, .  | 27                      | 33                                    | 33    | 33    | 25-30                                    | 25-30 | 25    |
| Wayland, . . .                          | Middlesex, .  | 15                      | -                                     | -     | 13    | -  | -     | 9     |
| Wenham, . . .                           | Essex, . .    | 15-18                   | -                                     | 14    | 14    | -  | 9     | 11    |
| Westborough, . .                        | Worcester, .  | 15                      | -                                     | 12    | 12    | -  | 10    | 9     |
| West Boylston, . .                      | Worcester, .  | Screened<br>gravel.     | -                                     | -     | 12    | -  | -     | 9     |
| Westfield (East), .                     | Hampden, .    | 15-18                   | 13                                    | 13    | 16    | 9  | 9     | 12    |
| Westfield (West), .                     | Hampden, .    | 18                      | -                                     | -     | 14    | -  | -     | 11    |
| Westminster, . .                        | Worcester, .  | 15                      | 15                                    | 15    | 15    | 9  | 10    | 14    |
| West Newbury, . .                       | Essex, . .    | 15                      | 14                                    | 12    | 14    | 8  | 8     | 9     |
| Weston, . . . .                         | Middlesex, .  | Gravel,                 | -                                     | -     | 25    | -  | -     | 20    |
| Westport, . . .                         | Bristol, .    | 18                      | 14                                    | 21    | 21    | 14                                       | 12    | 12    |
| West Springfield, .                     | Hampden, .    | 18                      | 12-15                                 | 14    | 18    | 10                                       | 10    | 15    |
| West Tisbury, . .                       | Dukes Co.,    | 10-12-15                | -                                     | 15-20 | 15    | -  | 8-15  | 7     |
| Weymouth, . . .                         | Norfolk, .    | 15                      | 21                                    | 18-21 | 17    | 21                                       | 12-15 | 10    |
| Whitman, . . .                          | Plymouth, .   | 18                      | 15                                    | 22    | 21    | 11                                       | 13    | 12    |
| Wilbraham, . . .                        | Hampden, .    | 15                      | 8-9                                   | 11    | 11    | 7  | 8     | 8     |
| Williamsburg, . .                       | Hampshire, .  | 15                      | -                                     | 12    | 12    | -  | 8     | 8     |
| Williamstown, . .                       | Berkshire, .  | 15                      | 10-12                                 | 13    | 13    | 9  | 9     | 10    |
| Windsor, . . . .                        | Berkshire, .  | Gravel,                 | -                                     | 12    | 9     | -  | 6     | 6     |
| Worcester (Paxton), .                   | Worcester, .  | 15                      | -                                     | 12    | 20    | -  | 10    | 10    |
| Worcester (Holden), .                   | Worcester, .  | 15                      | -                                     | -     | 14    | -  | -     | 10    |
| Wrentham (Norfolk<br>end).              | Norfolk, .    | 15                      | -                                     | 11    | 10    | -  | 8     | 7     |
| Wrentham (North Attle-<br>borough end). | Norfolk, .    | 15                      | -                                     | 11    | 18    | -  | 8     | 7     |
| Yarmouth (North), .                     | Barnstable, . | 15                      | -                                     | 15-21 | 21    | -  | 12-15 | 9     |
| Yarmouth (South), .                     | Barnstable, . | 15                      | -                                     | 12-21 | 21    | -  | 8-15  | 7     |

## APPENDIX B.

## SHOWING CONTRACT PRICES ON

|    | TOWN OR CITY.                     | Number of Contract. | Contractor.             | EXCAVATION.             |                      |                     | RUBBLE MASONRY.   |                      |
|----|-----------------------------------|---------------------|-------------------------|-------------------------|----------------------|---------------------|-------------------|----------------------|
|    |                                   |                     |                         | All Kinds (Cubic Yard). | Borrow (Cubic Yard). | Ledge (Cubic Yard). | Dry (Cubic Yard). | Cement (Cubic Yard). |
| 1  | Ashby, . . .                      | 303                 | Town, . . .             | 1 -                     | -                    | \$1 75              | \$3 00            | \$6 00               |
| 2  | Ashfield, . . .                   | 296                 | Joseph D. Gennaro, .    | \$0 22                  | \$0 26               | 1 00                | 3 50              | 6 00                 |
| 3  | Ashfield, <sup>3</sup> . . .      | 304                 | Tuttle & Edgerly, . .   | 20                      | 20                   | 80                  | 6 00              | 6 75                 |
| 4  | Auburn, . . .                     | 333                 | Town, . . .             | 35                      | 35                   | 1 75                | 4 00              | 7 00                 |
| 5  | Beverly, . . .                    | 316                 | City, . . .             | 40                      | 40                   | 1 75                | 4 00              | 7 00                 |
| 6  | Bourne, . . .                     | 323                 | Town, . . .             | 30                      | -                    | 1 75                | 3 50              | 7 00                 |
| 7  | Brockton, . . .                   | 317                 | City, . . .             | 1 -                     | 30                   | 1 75                | 3 00              | 6 50                 |
| 8  | Brookfield, <sup>10</sup> . . .   | 307                 | Town, . . .             | 35                      | 40                   | 1 75                | 3 50              | 7 00                 |
| 9  | Buckland, <sup>11, 12</sup> . . . | 308                 | Town, . . .             | 30                      | -                    | 1 75                | 3 00              | 6 00                 |
| 10 | Charlemont, . . .                 | 299                 | Town, . . .             | 30                      | 30                   | 1 75                | 3 00              | 6 00                 |
| 11 | Charlemont, . . .                 | 351                 | Jarvis Engineering Co., | -                       | -                    | -                   | -                 | <sup>14</sup> 8 67   |
| 12 | Chelmsford, . . .                 | 345                 | C. H. Kelleher, . . .   | 25                      | -                    | 2 00                | 5 00              | 8 00                 |
| 13 | Chicopee, . . .                   | 352                 | City, . . .             | 35                      | 30                   | 1 75                | 5 00              | 8 00                 |
| 14 | Colrain, . . .                    | 318                 | Town, . . .             | 35                      | -                    | 2 00                | 4 00              | 7 00                 |
| 15 | Concord, . . .                    | 319                 | Town, . . .             | 35                      | 35                   | 1 75                | 4 00              | 7 00                 |
| 16 | Dennis, . . .                     | 280                 | A. J. Wellington, . .   | 25                      | 30                   | -                   | 4 00              | 8 00                 |
| 17 | Erving, . . .                     | 349                 | J. D. Shea, . . .       | 24½                     | -                    | 1 10                | 2 50              | 6 50                 |
| 18 | Gardner, . . .                    | 292                 | Town, . . .             | 30                      | -                    | 1 75                | 3 00              | 7 00                 |
| 19 | Gloucester, . . .                 | 283                 | City, . . .             | 40                      | 50                   | 1 25                | 3 00              | 6 00                 |
| 20 | Hadley, . . .                     | 336                 | A. J. Wellington, . .   | 50                      | 60                   | 4 00                | 6 00              | 12 00                |
| 21 | Hancock, . . .                    | 298                 | Harries & Letteney, .   | 28                      | 35                   | -                   | 3 50              | 4 75                 |

<sup>1</sup> Sand and gravel 30 cents and hard-pan and clay 50 cents per cubic yard.<sup>3</sup> Bridge contract No. 344, Walsh Boiler and Iron Works, \$895.<sup>10</sup> Flume and coffer-dam at cost.<sup>11</sup> Superstructures of bridges at cost.<sup>12</sup> Deduction of \$1,000, contributed by town.<sup>14</sup> Masonry for bridge foundation.

## APPENDIX B.

## STATE ROADS DURING 1898.

| Gravel (Cubic Yard).        | Telford (Square Yard). | Shaping (Square Yard). | BROKEN STONE.       |             | PIPE CULVERTS.                  |  | Fencing (Linear Foot).         | Side Drains (Linear Foot). | Bounds (Each). | Catch-basins (Each). |    |
|-----------------------------|------------------------|------------------------|---------------------|-------------|---------------------------------|--|--------------------------------|----------------------------|----------------|----------------------|----|
|                             |                        |                        | Local (Ton).        | Trap (Ton). | Twelve-inch Clay (Linear Foot). | Other Kinds (Linear Foot).   |                                |                            |                |                      |    |
| \$0 50                      | \$0 30                 | \$0 02                 | <sup>2</sup> \$1 55 | -           | \$0 60                          | -  | \$0 15                         | \$0 30                     | \$1 25         | Cost                 | 1  |
| -                           | -                      | -                      | -                   | -           | 50                              | -  | 15                             | 40                         | 1 50           | -                    | 2  |
| -                           | -                      | -                      | -                   | -           | <sup>4</sup> 2 00               | <sup>5</sup> \$2 00  | 16                             | 30                         | 1 50           | -                    | 3  |
| 50                          | 30                     | 02                     | -                   | \$1 75      | 60                              | -  | 15                             | 35                         | 1 40           | -                    | 4  |
| 50                          | 35                     | 02                     | -                   | 1 80        | <sup>6</sup> 45                 | <sup>7</sup> 35  | 15                             | 35                         | 1 25           | Cost                 | 5  |
| <sup>8</sup> 75             | 35                     | 02                     | 1 65                | -           | 60                              | <sup>9</sup> Cost  | 15                             | 35                         | 1 25           | Cost                 | 6  |
| 50                          | 30                     | 02                     | 1 15                | -           | 60                              | -  | 15                             | 30                         | 1 50           | Cost                 | 7  |
| 60                          | 35                     | 02                     | -                   | 1 85        | 60                              | -  | 15                             | 35                         | 1 35           | -                    | 8  |
| 50                          | 30                     | 02                     | -                   | 1 95        | 60                              | -  | 15                             | -                          | 1 50           | -                    | 9  |
| 50                          | 35                     | 02                     | <sup>13</sup> 1 85  | 2 05        | 60                              | -  | 15                             | 35                         | 1 25           | Cost                 | 10 |
| -                           | -                      | -                      | -                   | -           | -                               | -  | -                              | -                          | -              | -                    | 11 |
| 45                          | 30                     | 02                     | -                   | 1 90        | 60                              | <sup>6</sup> 50  | 20                             | <sup>15</sup> 20           | 1 00           | \$20 00              | 12 |
| 98                          | 40                     | 02                     | -                   | 1 70        | 60                              | -  | 15                             | <sup>15</sup> 40           | 1 50           | 35 00                | 13 |
| <sup>8</sup> 1 00 }<br>50 } | 35                     | 02                     | -                   | -           | 60                              | <sup>4</sup> 2 00  | 15                             | 35                         | 1 50           | Cost                 | 14 |
| 50                          | 35                     | 02                     | 1 45                | -           | 60                              | <sup>16</sup> Cost   | 15                             | 35                         | 1 35           | Cost                 | 15 |
| -                           | -                      | 02                     | 1 30                | -           | 60                              | <sup>6</sup> 60<br><sup>17</sup> 80<br><sup>18</sup> 1 30 }<br><sup>4</sup> 1 45 | 25                             | -                          | 1 50           | 20 00                | 16 |
| 49                          | 25                     | -                      | -                   | -           | 60                              | <sup>4</sup> 1 45  | 14 <sup>1</sup> / <sub>2</sub> | <sup>15</sup> 26           | 1 50           | 15 00                | 17 |
| 50                          | 35                     | -                      | -                   | -           | 60                              | -  | 15                             | 35                         | 1 50           | -                    | 18 |
| 1 00                        | 30                     | 02                     | 1 25                | -           | 60                              | <sup>19</sup> Cost   | 17                             | 30                         | 1 75           | Cost                 | 19 |
| 80                          | 50                     | 02                     | -                   | 2 20        | 70                              | -  | 25                             | 50                         | 1 50           | -                    | 20 |
| 58                          | -                      | -                      | -                   | -           | -                               | -  | 15                             | 22                         | 1 00           | -                    | 21 |

<sup>2</sup> Original contract price; 10 cents per ton deducted because of use of State roller.<sup>4</sup> Twenty-four inch vitrified clay pipe, laid on gravel base.<sup>5</sup> Twenty-four inch vitrified clay pipe, laid on concrete base. <sup>6</sup> Ten inch vitrified clay pipe, laid.<sup>7</sup> Eight inch vitrified clay pipe, laid. <sup>8</sup> Screened gravel. <sup>9</sup> Twelve inch cast-iron pipe, laid.<sup>13</sup> Red granite.<sup>15</sup> Side-drain extensions 20 cents per lineal foot.<sup>16</sup> Sixteen inch cast-iron pipe, laid.<sup>17</sup> Fifteen inch vitrified clay pipe, laid.<sup>18</sup> Ten inch cast-iron pipe, laid.<sup>19</sup> Eighteen inch cast-iron pipe, laid.



## SHOWING CONTRACT PRICES ON

|    | TOWN OR CITY.                 | Number of Contract. | Contractor.             | EXCAVATION.             |                      |                     | RUBBLE MASONRY.    |                      |
|----|-------------------------------|---------------------|-------------------------|-------------------------|----------------------|---------------------|--------------------|----------------------|
|    |                               |                     |                         | All Kinds (Cubic Yard). | Borrow (Cubic Yard). | Ledge (Cubic Yard). | Dry (Cubic Yard).  | Cement (Cubic Yard). |
| 1  | Holbrook-Weymouth,            | 286                 | J. S. Lane & Son, . .   | \$0 30                  | -                    | \$2 50              | -                  | -                    |
| 2  | Holden, . . .                 | 300                 | Town, . . .             | 35                      | -                    | 1 75                | \$3 00             | \$6 00               |
| 3  | Leicester, . . .              | 293                 | Town, . . .             | 35                      | \$0 35               | 1 75                | 3 00               | 7 00                 |
| 4  | Lexington, . . .              | 285                 | Town, . . .             | 8 -                     | -                    | 1 75                | 3 50               | 8 00                 |
| 5  | Lowell, . . .                 | 291                 | Asa Goddard, . .        | 40                      | -                    | 2 00                | -                  | 8 00                 |
| 6  | Lunenburg, . . .              | 310                 | C. H. Kelleher, . .     | 25                      | 35                   | -                   | 3 00               | 6 00                 |
| 7  | Marshfield, . . .             | 320                 | Town, . . .             | 30                      | -                    | 1 75                | 4 00               | 7 00                 |
| 8  | Merrimac, . . .               | 346                 | Michael Cashman, . .    | 32                      | 40                   | 1 50                | 3 00               | 5 00                 |
| 9  | Middleborough, <sup>9</sup>   | 321                 | Town, . . .             | 30                      | -                    | 1 75                | 3 50               | 7 00                 |
| 10 | Montague, <sup>10</sup> . . . | 297                 | Town, . . .             | 25                      | 25                   | 1 75                | 4 00               | 7 00                 |
| 11 | Newburyport, . . .            | 342                 | Michael Cashman, . .    | 17                      | -                    | 10                  | 2 50               | 3 50                 |
| 12 | Norfolk, . . .                | 353                 | Town, . . .             | -                       | -                    | -                   | -                  | -                    |
| 13 | Northampton, . . .            | 337                 | City, . . .             | 35                      | 40                   | 1 75                | 3 50               | 7 00                 |
| 14 | Northborough, . . .           | 334                 | Fred E. Ellis, . .      | 40                      | -                    | 1 00                | 6 00               | 9 00                 |
| 15 | North Reading, . . .          | 347                 | C. H. Kelleher, . .     | 25                      | -                    | 2 00                | 4 50               | 8 00                 |
| 16 | Paxton, . . .                 | 301                 | Town, . . .             | 13 -                    | -                    | 1 75                | 3 00               | 6 00                 |
| 17 | Phillipston, . . .            | 328                 | J. J. Welch & Co., . .  | 30                      | 40                   | 2 00                | 4 00               | 7 00                 |
| 18 | Pittsfield, . . .             | 325                 | Harries & Letteney, . . | 40                      | 38                   | 4 25                | 4 60               | 7 80                 |
| 19 | Plymouth, . . .               | 302                 | Edwin D. Bell, . .      | 25                      | -                    | -                   | -                  | -                    |
| 20 | Revere, . . .                 | 288                 | T. Stuart & Son, . .    | 16 30                   | 17 50                | 1 50                | 3 75               | 5 00/<br>18 4 50     |
| 21 | Richmond, . . .               | 338                 | Town, . . .             | 26 $\frac{2}{3}$        | -                    | 1 16 $\frac{2}{3}$  | 2 33 $\frac{1}{2}$ | 4 66 $\frac{2}{3}$   |
| 22 | Russell, <sup>25</sup> . . .  | 294                 | Town, . . .             | 30                      | -                    | 1 50                | 3 00               | 7 00                 |
| 23 | Russell, <sup>25</sup> . . .  | 339                 | Town, . . .             | 30                      | 30                   | 1 75                | 3 50               | 7 00                 |
| 24 | Sandwich, <sup>26</sup> . . . | 335                 | Town, . . .             | 30                      | 30                   | 1 75                | 4 00               | 7 00                 |
| 25 | Shrewsbury, . . .             | 311                 | Town, . . .             | 40                      | 40                   | 1 75                | -                  | 7 00                 |
| 26 | South Hadley, . . .           | 343                 | Amos D. Bridge, . .     | 20                      | 50                   | 1 40                | 3 75               | 6 00                 |

<sup>8</sup> Sand and gravel 35 cents and hard pan and clay 50 cents per cubic yard.<sup>9</sup> Moving and rebuilding common wall, \$1.50 per rod.<sup>10</sup> Grubbing, \$175.<sup>13</sup> Sand and gravel 35 cents and hard pan and clay 45 cents per cubic yard.<sup>16</sup> Loam, per cubic yard.<sup>17</sup> Sodding, 2  $\frac{1}{2}$  cents per square foot.<sup>18</sup> Concrete masonry.<sup>25</sup> Superstructures of bridges at cost.<sup>26</sup> Repairs on bridge, at cost.

STATE ROADS DURING 1898 — *Continued.*

| Gravel (Cubic Yard).   | Telford (Square Yard).         | Shaping (Square Yard).         | BROKEN STONE.     |             | PIPE CULVERTS.                  |                                     | Fencing (Linear Foot).               | Side Drains (Linear Foot).     | Bounds (Each). | Catch-basins (Each). |    |
|--|--------------------------------|--------------------------------|-------------------|-------------|---------------------------------|-------------------------------------|--------------------------------------|--------------------------------|----------------|----------------------|----|
|  |                                |                                | Local (Ton).      | Trap (Ton). | Twelve-inch Clay (Linear Foot). | Other Kinds (Linear Foot).          |                                      |                                |                |                      |    |
| \$0 35   | -                              | \$0 02                         | \$1 20            | -           | -                               | -                                   | -                                    | \$0 35                         | -              | -                    | 1  |
| 65   | \$0 30                         | 02                             | 1 36              | -           | \$0 60                          | -                                   | \$0 15                               | 35                             | \$1 50         | -                    | 2  |
| 1 15   | <sup>1</sup> 1 00              | 02                             | <sup>2</sup> 1 30 | -           | 65                              | -                                   | 15                                   | 35                             | 1 50           | Cost                 | 3  |
| 60   | 30                             | 02                             | 1 45              | -           | 60                              | <sup>4</sup> Cost                   | 15                                   | 35                             | 1 50           | <sup>5</sup> Cost    | 4  |
| 65   | -                              | 02                             | -                 | \$1 85      | <sup>6</sup> 1 00               | <sup>7</sup> \$0 50                 | -                                    | 35                             | 1 50           | \$25 00              | 5  |
| 55   | -                              | 02                             | 1 30              | 1 75        | 60                              | <sup>6</sup> 90                     | 15                                   | -                              | 1 50           | -                    | 6  |
| 50   | 33                             | 02                             | 1 55              | -           | 60                              | -                                   | 15                                   | 35                             | 1 50           | -                    | 7  |
| 60   | 40                             | 01 <sup>3</sup> / <sub>4</sub> | 1 35              | -           | 50                              | -                                   | 23                                   | <sup>8</sup> 22                | 75             | -                    | 8  |
| 60   | 30                             | 02                             | 1 35              | -           | 60                              | -                                   | 15                                   | 30                             | 1 40           | -                    | 9  |
| 75   | 35                             | 02                             | -                 | 1 80        | 60                              | -                                   | 15                                   | -                              | 1 25           | -                    | 10 |
| 29   | 40                             | 01                             | 1 00              | -           | <sup>7</sup> 25                 | <sup>11</sup> 1 60                  | 23                                   | <sup>8</sup> 20                | 50             | 26 00                | 11 |
| -  | -                              | -                              | 1 60              | -           | -                               | -                                   | -                                    | -                              | -              | -                    | 12 |
| 60   | 30                             | 02                             | -                 | 1 90        | 60                              | <sup>12</sup> 2 00                  | 15                                   | 35                             | 1 50           | -                    | 13 |
| 45   | 30                             | 02                             | 1 20              | -           | 80                              | -                                   | 30                                   | 30                             | 1 50           | -                    | 14 |
| 45   | 20                             | 02                             | 1 30              | -           | 60                              | -                                   | 20                                   | <sup>8</sup> 35                | 1 50           | -                    | 15 |
| 60   | 30                             | 02                             | 1 45              | -           | 60                              | -                                   | 15                                   | 35                             | 1 50           | Cost                 | 16 |
| 50   | 35                             | 02                             | 1 39              | -           | 60                              | <sup>14</sup> 2 00                  | 15                                   | 35                             | 1 50           | -                    | 17 |
| 80   | 36                             | 02                             | -                 | 1 94        | 58                              | -                                   | 16                                   | 29                             | 1 50           | -                    | 18 |
| 40   | <sup>15</sup> 77               | 02 <sup>1</sup> / <sub>4</sub> | 1 29              | -           | -                               | -                                   | -                                    | -                              | -              | -                    | 19 |
| 95   | <sup>15</sup> 50               | 02                             | -                 | 2 00        | <sup>19</sup> 50<br>45          | <sup>20</sup> 12<br>20              | <sup>21</sup> 17<br><sup>22</sup> 20 | 40                             | 1 00           | 37 00                | 20 |
| <sup>23</sup> 36 <sup>3</sup> / <sub>4</sub><br>43 <sup>1</sup> / <sub>2</sub> | 23 <sup>1</sup> / <sub>2</sub> | -                              | -                 | -           | 40                              | <sup>24</sup> 50<br><sup>6</sup> 60 | 10                                   | 23 <sup>1</sup> / <sub>2</sub> | 1 00           | -                    | 21 |
| 65   | 30                             | -                              | -                 | -           | 60                              | -                                   | 15                                   | 35                             | 1 25           | Cost                 | 22 |
| 70   | 30                             | -                              | -                 | -           | 60                              | <sup>24</sup> 75                    | 15                                   | 35                             | 1 25           | -                    | 23 |
| 60   | 35                             | 02                             | 1 60              | -           | 60                              | -                                   | 15                                   | 35                             | 1 35           | -                    | 24 |
| 85   | 35                             | 02                             | 1 57              | -           | 60                              | -                                   | 15                                   | 35                             | 1 50           | -                    | 25 |
| 60   | 60                             | 02 <sup>1</sup> / <sub>2</sub> | -                 | 1 90        | 70                              | -                                   | 15                                   | <sup>8</sup> 22                | 1 50           | -                    | 26 |

<sup>1</sup> As specified, per ton.<sup>2</sup> Original contract price; 10 cents per ton deducted because of use of State roller.<sup>4</sup> Twelve inch cast-iron pipe, laid.<sup>5</sup> Brick inlets.<sup>6</sup> Eighteen inch vitrified clay pipe, laid.<sup>7</sup> Eight inch vitrified clay pipe, laid.<sup>8</sup> Side-drain extensions 20 cents per lineal foot.<sup>11</sup> Eighteen inch cast-iron pipe, laid.<sup>12</sup> Twenty-four inch vitrified clay pipe, laid on gravel base.<sup>14</sup> Twenty-four inch vitrified clay pipe, laid on concrete base.<sup>15</sup> Cobble gutters, per square yard.<sup>19</sup> Ten inch vitrified clay pipe, laid.<sup>20</sup> Piling, per lineal foot.<sup>21</sup> With wooden posts.<sup>22</sup> With iron posts.<sup>23</sup> Screened gravel.<sup>24</sup> Fifteen inch vitrified clay pipe laid.

## SHOWING CONTRACT PRICES ON

|    | TOWN OR CITY.                 | Number of Contract. | Contractor.           | EXCAVATION.             |                      |                     | RUBBLE MASONRY.   |                      |
|----|-------------------------------|---------------------|-----------------------|-------------------------|----------------------|---------------------|-------------------|----------------------|
|    |                               |                     |                       | All Kinds (Cubic Yard). | Borrow (Cubic Yard). | Ledge (Cubic Yard). | Dry (Cubic Yard). | Cement (Cubic Yard). |
| 1  | Sterling, . . .               | 322                 | Town, . . .           | \$0 35                  | \$0 35               | \$1 75              | \$4 00            | \$7 00               |
| 2  | Sudbury, <sup>1</sup> . .     | 348                 | White & Gaffey, . .   | 25                      | 50                   | 2 00                | 2 75              | 7 00                 |
| 3  | Swampscott, . .               | 279                 | Tuttle & Edgerly, . . | 35                      | -                    | 80                  | 5 50              | 6 00                 |
| 4  | Taunton, . . .                | 312                 | City, . . .           | 35                      | -                    | 1 75                | 3 50              | 7 00                 |
| 5  | Townsend, . .                 | 330                 | C. H. Kelleher, . .   | 30                      | -                    | 2 50                | 4 50              | 8 00                 |
| 6  | Truro, . . .                  | 313                 | C. W. Snow, . . .     | <sup>8</sup> 20         | -                    | -                   | -                 | -                    |
| 7  | Uxbridge, . . .               | 331                 | Pike & Eames, . .     | 32                      | -                    | 1 50                | 3 00              | 7 00                 |
| 8  | Walpole, . . .                | 340                 | John J. Falvey, . .   | 30                      | 30                   | 2 00                | 3 00              | 6 00                 |
| 9  | Wareham, . . .                | 282                 | Town, . . .           | 25                      | 35                   | 1 75                | 3 50              | 6 00                 |
| 10 | Warren, . . .                 | 305                 | J. S. Lane & Son, . . | 35                      | 40                   | 2 00                | -                 | 4 00                 |
| 11 | West Boylston, .              | 332                 | Town, . . .           | 30                      | -                    | 1 75                | 3 50              | 7 00                 |
| 12 | Westfield, . .                | 295                 | Town, . . .           | 35                      | 35                   | 1 75                | 3 00              | 7 00                 |
| 13 | Westfield, . . .              | 350                 | Town, . . .           | 30                      | 30                   | 1 75                | 4 00              | 7 00                 |
| 14 | Westminster, <sup>11</sup> .  | 326                 | C. H. Kelleher, . .   | 30                      | 35                   | 3 00                | 5 00              | 8 00                 |
| 15 | Westport, . . .               | 289                 | A. J. Wellington, . . | 50                      | -                    | 4 00                | 4 00              | 8 00                 |
| 16 | Williamsburg, <sup>13</sup> . | 290                 | Town, . . .           | 16½                     | -                    | 82½                 | 1 65              | 3 30                 |
| 17 | Williamstown, .               | 315                 | Town, . . .           | 40                      | 45                   | 1 75                | 4 50              | 7 00                 |
| 18 | Wrentham, . .                 | 306                 | Town, . . .           | 30                      | 30                   | 1 75                | 4 00              | 7 00                 |

<sup>1</sup> Superstructure of bridge, \$450.<sup>8</sup> Clay, \$1.29 per cubic yard.<sup>11</sup> Superstructure of bridge, \$175.<sup>13</sup> Superstructure of bridge, 55 per cent. of cost.

STATE ROADS DURING 1898 — *Concluded.*

| Gravel (Cubic Yard). | Telford (Square Yard) | Shaping (Square Yard). | BROKEN STONE.      |             | PIPE CULVERTS.                  |                            | Fencing (Linear Foot). | Side Drains (Linear Foot). | Bounds (Each). | Catch-basins (Each).                         |    |
|----------------------|-----------------------|------------------------|--------------------|-------------|---------------------------------|----------------------------|------------------------|----------------------------|----------------|--|----|
|                      |                       |                        | Local (Ton).       | Trap (Ton). | Twelve-inch Clay (Linear Foot). | Other Kinds (Linear Foot). |                        |                            |                |  |    |
| \$0 40               | \$0 35                | \$0 02                 | -                  | \$1 50      | \$0 60                          | -                          | \$0 15                 | \$0 35                     | \$1 30         | Cost   | 1  |
| 50                   | 30                    | 02½                    | \$1 50             | -           | <sup>2</sup> 1 50               | -                          | 17                     | <sup>4</sup> 35            | 1 50           | \$20 00                                      | 2  |
| 40                   | -                     | -                      | -                  | -           | <sup>3</sup> 3 00               | -                          | 14                     | 25                         | 1 00           | <sup>7</sup> 35 00 }<br><sup>7</sup> 30 00 } | 3  |
| 55                   | 35                    | 02                     | 1 50               | -           | <sup>5</sup> 55                 | <sup>2</sup> \$1 50        | 15                     | 35                         | 1 35           | -  | 4  |
| 60                   | 35                    | 02                     | 1 35               | -           | <sup>5</sup> 40                 | <sup>6</sup> 2 50          | 20                     | 30                         | 2 00           | -  | 5  |
| -                    | -                     | -                      | 2 00               | -           | -                               | -                          | -                      | -                          | -              | -  | 6  |
| 46                   | 30                    | 01½                    | 1 28               | -           | 60                              | -                          | 15                     | 26                         | 1 50           | -  | 7  |
| 35                   | 35                    | 02                     | 1 28               | -           | 60                              | -                          | 20                     | 30                         | 1 50           | -  | 8  |
| -                    | 35                    | 02                     | 1 70               | -           | 60                              | -                          | 15                     | 35                         | 1 25           | Cost   | 9  |
| 50                   | 25                    | 02                     | -                  | 1 80        | 50                              | -                          | 15                     | -                          | 1 25           | -  | 10 |
| <sup>9</sup> 1 00    | 30                    | 02                     | <sup>10</sup> 2 00 | -           | 60                              | -                          | 15                     | 30                         | 1 30           | -  | 11 |
| 50                   | 35                    | 02                     | -                  | 1 20        | 60                              | -                          | 15                     | 30                         | 1 25           | -  | 12 |
| 50                   | 30                    | 02                     | -                  | 1 25        | 60                              | -                          | 15                     | <sup>4</sup> 30            | 1 25           | -  | 13 |
| 50                   | 25                    | 02                     | 1 30               | -           | 50                              | <sup>12</sup> 90           | 15                     | 25                         | 1 00           | 15 00  | 14 |
| 60                   | -                     | 02                     | 1 65               | -           | <sup>5</sup> 40                 | -                          | 25                     | 40                         | 1 50           | <sup>7</sup> 20 00                           | 15 |
| 27½                  | 16½                   | -                      | -                  | -           | 33                              | -                          | 08½                    | 19½                        | 68½            | -  | 16 |
| 65                   | 30                    | 02                     | 1 70               | 2 00        | 60                              | <sup>14</sup> 50           | 15                     | 35                         | 1 50           | 15 00  | 17 |
| 55                   | 30                    | 02                     | 1 55               | -           | 60                              | -                          | 15                     | 35                         | 1 40           | -  | 18 |

<sup>2</sup> Twelve inch cast-iron pipe, laid.<sup>3</sup> Twenty inch cast-iron pipe, laid.<sup>4</sup> Side-drain extensions 20 cents per lineal foot.<sup>5</sup> Eight inch vitrified clay pipe, laid.<sup>6</sup> Eighteen inch cast-iron pipe, laid.<sup>7</sup> Brick inlets.<sup>9</sup> Screened gravel.<sup>10</sup> Original contract price; 10 cents per ton deducted because of use of State roller.<sup>12</sup> Eighteen inch vitrified clay pipe, laid.<sup>14</sup> Ten inch vitrified clay pipe, laid.

## APPENDIX C.

LIST OF COMPLETED ROADS FINALLY APPROVED  
DURING THE YEAR 1898, WITH DATES OF  
APPROVAL.

| CITY OR TOWN.       | Year<br>of<br>Lay-out. | Number<br>of<br>Contract. | Contractor.                 | Date of<br>Approval of<br>Work done<br>under Con-<br>tract. |
|---------------------|------------------------|---------------------------|-----------------------------|---|
| Acushnet, . . . .   | 1897                   | 186                       | Town, . . . .               | Nov. 10, 1898.  |
| Adams, . . . .      | 1897                   | 245                       | George Shand, . . . .       | Sept. 22, 1898.   |
| Andover, . . . .    | 1897                   | 187                       | Town, . . . .               | May 5, 1898.  |
| Ashfield, . . . .   | 1897                   | 268                       | Keene & Foster, . . . .     | Oct. 12, 1898.  |
| Auburn, . . . .     | 1897                   | 188                       | Town, . . . .               | Sept. 29, 1898.   |
| Barnstable, . . . . | 1897                   | 243                       | A. J. Wellington, . . . .   | May 12, 1898.   |
| Barre, . . . .      | 1897                   | 246                       | Thomas Hennessy, . . . .    | June 9, 1898.   |
| Bedford, . . . .    | 1897                   | 233                       | W. H. Mague, . . . .        | May 5, 1898.  |
| Beverly, . . . .    | 1897                   | 271                       | City, . . . .               | Oct. 12, 1898.  |
| Boxborough, . . . . | 1897                   | 227                       | Town, . . . .               | July 28, 1898.  |
| Brimfield, . . . .  | 1897                   | 262                       | A. J. Wellington, . . . .   | Oct. 12, 1898.  |
| Brookfield, . . . . | 1897                   | 259                       | Town, . . . .               | Aug. 18, 1898.  |
| Buckland, . . . .   | 1897                   | 201                       | Town, . . . .               | Oct. 21, 1898.  |
| Charlemont, . . . . | 1897                   | 247                       | Town, . . . .               | May 5, 1898.  |
| Cohasset, . . . .   | 1897                   | 260                       | Town, . . . .               | Aug. 18, 1898.  |
| Concord, . . . .    | 1897                   | 217                       | Town, . . . .               | Aug. 18, 1898.  |
| Dennis, . . . .     | 1898                   | 280                       | A. J. Wellington, . . . .   | Sept. 1, 1898.  |
| Edgartown, . . . .  | 1897                   | 202                       | Town, . . . .               | May 19, 1898.   |
| Fitchburg, . . . .  | 1897                   | 254                       | City, . . . .               | Oct. 27, 1898.  |
| Gardner, . . . .    | 1897                   | 203                       | Town, . . . .               | July 14, 1898.  |
| Gardner, . . . .    | 1898                   | 292                       | Town, . . . .               | Nov. 16, 1898.  |
| Grafton, . . . .    | 1897                   | 225                       | Town, . . . .               | Aug. 4, 1898.   |
| Hancock, . . . .    | 1898                   | 298                       | Harries & Letteney, . . . . | Sept. 22, 1898.   |
| Hardwick, . . . .   | 1897                   | 263                       | A. J. Wellington, . . . .   | Aug. 18, 1898.  |
| Hingham, . . . .    | 1896                   | 149, 172                  | Town, . . . .               | Feb. 24, 1898.  |



LIST OF COMPLETED ROADS, ETC. — *Continued.*

| CITY OR TOWN.               | Year<br>of<br>Lay-out. | Number<br>of<br>Contract. | Contractor.             | Date of<br>Approval of<br>Work done<br>under Con-<br>tract. |
|-----------------------------|------------------------|---------------------------|-------------------------|---|
| Hingham, . . . .            | 1897                   | 228                       | Town, . . . .           | Feb. 24, 1898.  |
| Holbrook, . . . .           | 1894 and<br>1896       | 286                       | J. S. Lane & Son, . .   | July 28, 1898.  |
| Huntington, . . . .         | 1896                   | 127                       | Town, . . . .           | Oct. 12, 1898.  |
| Lawrence, . . . .           | 1896                   | 176                       | City, . . . .           | June 8, 1898.   |
| Leicester, . . . .          | 1896                   | 119                       | Town, . . . .           | Oct. 12, 1898.  |
| Lexington, . . . .          | 1897                   | 205                       | Town, . . . .           | Jan. 6, 1898.   |
| Lincoln, . . . .            | 1897                   | 190                       | Town, . . . .           | May 5, 1898.  |
| Lowell (South), . . . .     | 1897                   | 219                       | A. J. Wellington, . .   | May 5, 1898.  |
| Lowell (South), . . . .     | 1898                   | 291                       | Asa Goddard, . . . .    | Nov. 10, 1898.  |
| Marlborough (East), . . . . | 1897                   | 256                       | City, . . . .           | Aug. 18, 1898.  |
| Marlborough (West), . . . . | 1897                   | 272                       | City, . . . .           | Oct. 12, 1898.  |
| Merrimac, . . . .           | 1897                   | 248                       | C. H. Kelleher, . . . . | Oct. 12, 1898.  |
| Methuen, . . . .            | 1896                   | 177                       | Town, . . . .           | Jan. 6, 1898.   |
| Nantucket, . . . .          | 1896                   | 131                       | Town, . . . .           | Nov. 16, 1898.  |
| Nantucket, . . . .          | 1896                   | 175                       | Town, . . . .           | Nov. 16, 1898.  |
| Nantucket, . . . .          | 1897                   | 275                       | A. J. Wellington, . .   | Nov. 16, 1898.  |
| New Braintree, . . . .      | 1897                   | 263                       | A. J. Wellington, . .   | Aug. 18, 1898.  |
| Northampton, . . . .        | 1897                   | 212                       | City, . . . .           | Nov. 10, 1898.  |
| Northborough, . . . .       | 1897                   | 261                       | A. J. Wellington, . .   | Oct. 12, 1898.  |
| Northborough, . . . .       | 1898                   | 261                       | A. J. Wellington, . .   | Oct. 12, 1898.  |
| North Reading, . . . .      | 1897                   | 191                       | Town, . . . .           | May 5, 1898.  |
| Norwood, . . . .            | 1895                   | 102                       | Town, . . . .           | Oct. 12, 1898.  |
| Norwood, . . . .            | 1896                   | 132                       | Town, . . . .           | Oct. 12, 1898.  |
| Norwood, . . . .            | 1897                   | 250                       | Town, . . . .           | Oct. 12, 1898.  |
| Paxton, . . . .             | 1897                   | 193                       | Town, . . . .           | July 21, 1898.  |
| Paxton, . . . .             | 1898                   | 301                       | Town, . . . .           | Nov. 10, 1898.  |
| Pittsfield, . . . .         | 1897                   | 251                       | M. R. Fisk, . . . .     | Sept. 29, 1898.   |
| Revere, . . . .             | 1897                   | 278                       | A. J. Wellington, . .   | Dec. 22, 1898.  |
| Richmond, . . . .           | 1897                   | 238                       | Town, . . . .           | Dec. 8, 1898.   |
| Russell, . . . .            | 1896                   | 158                       | Town, . . . .           | Oct. 12, 1898.  |
| Russell, . . . .            | 1897                   | 229                       | Town, . . . .           | Oct. 12, 1898.  |
| Shelburne, . . . .          | 1897                   | 230                       | Town, . . . .           | Jan. 6, 1898.   |
| Shrewsbury, . . . .         | 1897                   | 194                       | Town, . . . .           | Nov. 23, 1898.  |
| Shrewsbury, . . . .         | 1898                   | 311                       | Town, . . . .           | Dec. 8, 1898.   |
| Somerset, . . . .           | 1896                   | 152                       | Town, . . . .           | Feb. 24, 1898.  |
| South Hadley, . . . .       | 1897                   | 206                       | Town, . . . .           | Jan. 6, 1898.   |

LIST OF COMPLETED ROADS, ETC. — *Concluded.*

| CITY OR TOWN.            | Year<br>of<br>Lay-out. | Number<br>of<br>Contract. | Contractor.              | Date of<br>Approval of<br>Work done<br>under Con-<br>tract. |
|--------------------------|------------------------|---------------------------|--------------------------|---|
| Stoneham, . . . .        | 1897                   | 273                       | F. E. Ellis, . . . .     | June 9, 1898.   |
| Sturbridge, . . . .      | 1897                   | 269                       | Bowlen & Whitaker, . .   | Aug. 18, 1898.  |
| Sudbury, . . . .         | 1897                   | 257                       | A. J. Wellington, . .    | Aug. 18, 1898.  |
| Sunderland, . . . .      | 1897                   | 240                       | Town, . . . .            | May 26, 1898.   |
| Walpole, . . . .         | 1897                   | 244                       | J. A. Whittemore's Sons, | Jan. 27, 1898.  |
| Ware, . . . .            | 1897                   | 263                       | A. J. Wellington, . .    | Aug. 18, 1898.  |
| Wareham, . . . .         | 1898                   | 282                       | Town, . . . .            | Oct. 13, 1898.  |
| Wayland, . . . .         | 1897                   | 241                       | Town, . . . .            | Aug. 18, 1898.  |
| Wenham, . . . .          | 1897                   | 242                       | A. J. Wellington, . .    | Aug. 18, 1898.  |
| Westborough, . . . .     | 1897                   | 270                       | Town, . . . .            | Aug. 11, 1898.  |
| Westfield, . . . .       | 1898                   | 295                       | Town, . . . .            | Aug. 18, 1898.  |
| Weymouth (Ann Street), . | 1894                   | 286                       | J. S. Lane & Son, . .    | July 23, 1898.  |
| Weymouth, . . . .        | 1896                   | 138                       | Town, . . . .            | Nov. 10, 1898.  |
| Whitman, . . . .         | 1894                   | 37                        | Town, . . . .            | Nov. 16, 1898.  |
| Whitman, . . . .         | 1895                   | 94                        | Town, . . . .            | Nov. 16, 1898.  |
| Whitman, . . . .         | 1896                   | 113                       | Town, . . . .            | Nov. 16, 1898.  |
| Windsor, . . . .         | 1897                   | 253                       | Town, . . . .            | Dec. 8, 1898.   |
| Worcester, . . . .       | 1897                   | 277                       | E. E. Eames, . . . .     | Sept. 29, 1898.   |
| Wrentham, . . . .        | 1897                   | 196                       | Town, . . . .            | Oct. 12, 1898.  |

## APPENDIX D.

## REPORT OF THE GEOLOGIST.

*To the Massachusetts Highway Commission.*

GENTLEMEN:—Herewith is submitted a report of the work done during the year 1898 in the laboratory of the commission at the Lawrence Scientific School. More time than formerly has been devoted to experimental investigation, and there has been a noticeable increase in the amount of work done. This has been made possible through the action of the commission in discontinuing map work except in cases where it was especially needed.

For several years past the laboratory has been greatly in want of a new abrasion machine, the old one having been too small to meet the necessary demands. During the year a new one, with a capacity four times as great as that of the old one, was built at the laboratory, and has proved to be a most valuable acquisition. A considerable saving of time has also been effected by a modification in the method of conducting the abrasion test. The change, however, in no way affects the results.

The cementation test, which for several years has been in an experimental stage, has at last been thoroughly standardized. A description of it, with some of the results obtained, is appended hereto. With the consent of the commission an impact testing machine, similar to the one in use in this laboratory for testing the cementing value of stone, is at present being constructed for the Highway Commission of the State of Maryland, under the supervision of the writer. The results of the tests made by the Maryland commission will form a valuable addition to those obtained in this laboratory, and will furnish new testimony as to its practical value.

In former reports some description was given of the apparatus of this laboratory and of the methods of conducting certain tests; but in response to the request of the commission, a more complete description of the methods and apparatus now in use in this laboratory is included in the present report.

A special investigation, to determine the relative values of the various road-building gravels, is being carried on, and the results will be reported in a short time.

Two tables are presented with this report: Table I. shows the results of the abrasion and cementation tests, together with the petrographic determinations of the various stones; Table II. gives in percentages the mineralogical composition of seventy-six different specimens of stone, as determined by microscopic analysis.

The writer wishes to acknowledge his indebtedness to Mr. W. S. Burke and Mr. L. S. Marks for advice and assistance in his experimental work. He is also indebted to Dr. A. S. Eakle for assistance in petrography.

Respectfully submitted,

LOGAN WALLER PAGE,  
*Geologist.*

## DESCRIPTION OF LABORATORY AND APPARATUS, TOGETHER WITH RESULTS OF TESTS ON ROAD- BUILDING STONES.

The experimental work of the Massachusetts Highway Commission is carried on at the engineering laboratory of Harvard University. Most of the apparatus and the necessary power for running it are supplied by the University without charge. The experiments are conducted by the geologist of the commission and his assistant, with extra assistants when necessary. Specimens of stones to be tested for State highway use are sent to the laboratory by the resident engineers in charge of the work on the various roads. Each specimen is selected according to established rules (see 1897 report, page 73). Stones can be tested for persons who are not connected with the commission by obtaining the consent of the commission, the geologist of the commission selecting the specimens to be tested. The tests which have proved most useful thus far are the abrasion and cementation tests.

### THE ABRASION TEST.

The Deval test, which is used by the National School of Roads and Bridges of France, was described in the annual report of the commission last year. This test is almost identical with the abrasion test used by the commission, the only difference being the omission of certain processes not strictly necessary, for the purpose of saving time.

A new abrasion machine was constructed at the laboratory during the past year. It differs from the old one in being capable of carrying out four tests simultaneously, instead of one at a time. It is constructed entirely of cast iron, which greatly lessened its cost. With this new machine and the new methods of obtaining results, two tests a day can be completed; whereas with the old machine it was possible only to complete three in a week.

The new abrasion machine consists of four cylinders, each 20 cm. (7.9 inches) in diameter and 34 cm. (13.4 inches) in depth. Each of these cylinders is closed at one end and has a tightly fitting cover for the other. They are fastened to a shaft so that the axis of each cylinder is at an angle of  $30^{\circ}$  with the axis of rotation of the shaft. The shaft which holds the cylinders is supported by bearings, and at



one of its ends is a pulley by which the cylinders are revolved, at the other a revolution counter. A cut of the machine is shown opposite this page.

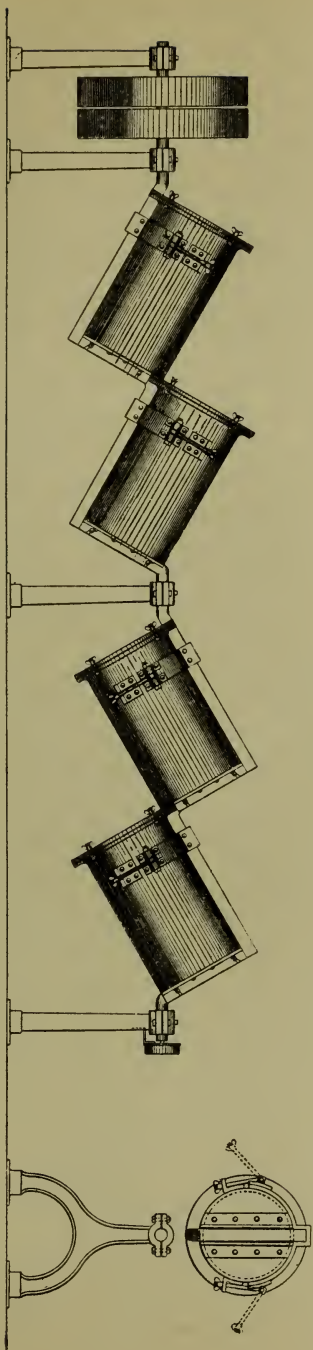
The stones employed in making the abrasion test are about the size used in making macadam roads, between 6.31 cm. ( $2\frac{1}{2}$  inches) and 3.18 cm. ( $1\frac{1}{4}$  inches) in diameter. In making a test 5 kgs. (11 pounds) of stone of the above dimensions, and perfectly clean, are placed in one of the cylinders; the cover is then bolted on, and the cylinder rotated at the rate of 2,000 revolutions per hour for five hours. Four tests can be made at once by using all four cylinders. At each revolution of the shaft the fragments of stone are thrown twice from one end of the cylinder to the other, which grinds them against one another and against the walls of the cylinder. After 10,000 revolutions have been made the machine is stopped, the cylinder opened and the contents placed on a sieve having .16 cm. ( $\frac{1}{16}$  inch) meshes. The material that passes through the sieve is put aside for the cementation test. The sieve and the remaining fragments of stone are then held under running water until all the adhering dust is washed off. After these remaining fragments have thoroughly dried they are carefully weighed, and their weight subtracted from 5 kgs. (11 pounds), the original weight of all the stone in the test. The difference obtained is the weight of the detritus under .16 cm. ( $\frac{1}{16}$  inch) worn off by the test. The percentage of the .16 cm. detritus may be taken as a coefficient of wear, or the coefficient adopted by the National School of Roads and Bridges of France may be used. The latter has been adopted by the commission, and may be obtained by the formula, —

$$\text{Coefficient of wear} = 20 \times \frac{20}{w} = \frac{400}{w}$$

where “w” is the weight in grammes of detritus under .16 cm. ( $\frac{1}{16}$  inch) in size obtained per kilogramme (2.2 pounds) of stone used. In Table I. may be seen the coefficients of wear obtained from 221 specimens.

#### THE CEMENTATION TEST.

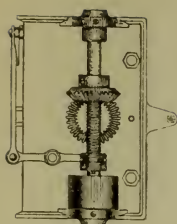
The purpose of the cementation test is to obtain the relative binding power of the various stones used in road making. Good binding power has long been known to road builders to be one of the most important properties possessed by a good road material. If the fine material of a road binds well, it protects the coarser stones beneath from wear, withstands better the actions of wind and rain, and prevents water from getting to the foundation of the road. Experiments have been carried on for the past five years, in the laboratory



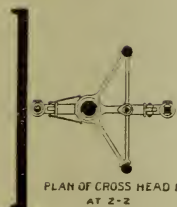
ABRADING MACHINE





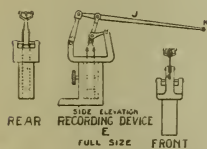


PLAN OF TOP

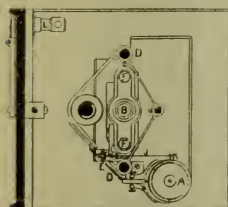


PLAN OF CROSS HEAD I  
AT Z-Z

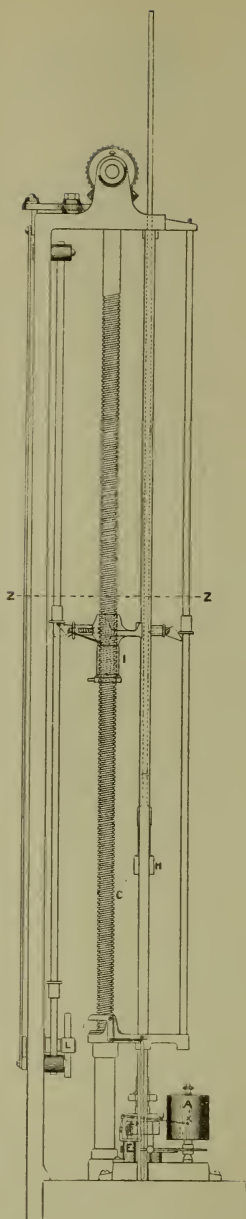
# IMPACT TESTING MACHINE



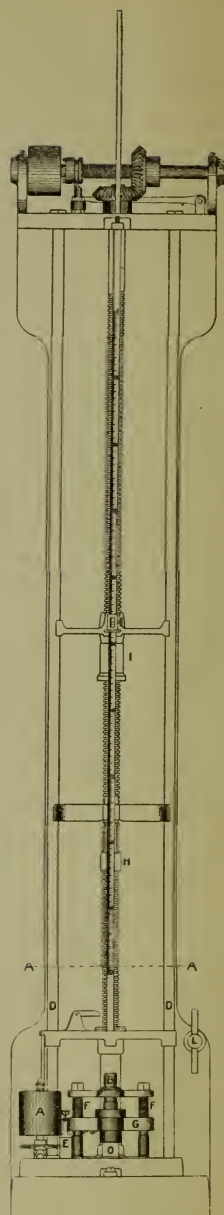
REAR  
FULL SIZE  
FRONT



SECTIONAL PLAN A-A



SIDE ELEVATION



FRONT ELEVATION



of the commission, to determine some way of testing this important property. The test finally adopted is an impact test, to which stone dust briquettes are subjected.

To make a briquette, dust that is to be tested is passed through a screen with forty meshes per cm. (100 per inch), and is obtained either from the detritus of the abrasion test or by specially reducing the stone. The reduction can be accomplished by placing some fragments of the stone in one of the cylinders of the abrasion machine, together with a flat-end steel hammer of about ten pounds weight, and allowing the machine to run until a sufficient quantity of the stone is pulverized. The dust is made into briquettes of circular section of 25 mm. (.98 of an inch) in diameter and 25 mm. in height, by placing the dust in a metal die of the proper dimensions, mixing with it enough distilled water to moisten the dust (4 c. c. or .24 of a cubic inch), inserting a closely fitting plug on top of the wet dust, and subjecting it to a pressure of 100 kgs. per square cm. (1,422 pounds per square inch). The weight of dust varies with the density and compressibility of the stone, but generally it requires about 25 gs. (.9 of an ounce) of dust to make a briquette of the above dimensions. Two weeks should be allowed for the briquettes to dry, at the ordinary temperature of a room.

A cut of the machine for testing these briquettes is shown opposite this page. It consists of a 1 kg. (2.2 pounds) hammer (H), arranged like the hammer of a pile driver on two vertical guides (D). The hammer is raised by a screw (C), and dropped automatically from any desired height. It falls on a plunger (B), which rests upon the briquette (O) to be tested. The plunger (B) is bolted to a cross-head (G), which is guided by two vertical rods (F). A small lever (J), carrying a pencil (K) at its free end, is connected to the side of the cross-head by a link motion, arranged so that it gives a vertical movement to the pencil six times as great as the movement of the cross-head. The pencil is pressed against a drum (A), and its movement is recorded on a slip of paper fastened thereon. The drum is moved automatically through a small angle at each stroke of the hammer; in this way a record is obtained of the movement of the hammer after each blow. The standard fall of the hammer for a test is 1 cm. (.39 of an inch), and the blow is repeated until the bond of cementation of the material is destroyed. The final blow is easily ascertained, for when the hammer falls on the plunger, if the material beneath it can withstand the blow, the plunger rebounds; if not, the plunger stays at the point to which it is driven. The automatic record thus obtained from each briquette is filed for future reference. The number of blows required to break the bond of cementation, as described above, is taken as representing the

binding power of each stone, and is so used in comparing this property in road materials. Table I. contains the results thus obtained of 116 tests. The briquettes hitherto have been compressed by a hydraulic testing machine. A small lever testing machine is at present being modified to do this work, and will undoubtedly be more suitable for the small pressure required.

#### THE AUTOMATIC SCREEN.

In preparing the stone dust for the cementation test an automatic screen, about 100 cm. (39.37 inches) long by 10 cm. (4 inches) in diameter is used. It consists of a cylinder of brass wire netting of five different meshes, 40 meshes per cm. (100 per inch) at one end and 8 meshes per cm. (20 per inch) at the other, the intermediate sizes being 33 per cm. (80 per inch), 25 per cm. (60 per inch) and 16 per cm. (40 per inch). The smallest size is at the end at which the dust to be sifted enters. The cylinder is mounted on bearings at a slight angle with the horizontal. Into the upper end of the cylinder the unscreened dust is automatically fed from a hopper while the cylinder is rotating, and in its passage along the cylinder is sifted into the several sizes. The upper end of the cylinder rests on wheel bearings, and on the bearing surface there are several ridges which lift the cylinder whenever they pass over the wheels. This shaking device is necessary to prevent the finer meshes of the screen from getting clogged with dust. Dust can be sifted very rapidly with a screen of this kind, and, as the cylinder is completely covered, no dust can escape into the air. A drawing of this machine is shown opposite this page. Only the finest mesh is necessary for the standard cementation test, the other sizes being used for future investigations.

#### COMPRESSION TESTING MACHINES.

There are two testing machines belonging to the University which are used when occasion demands. One is an Olsen, with a capacity of 200,000 pounds; the other is the Riehlé, with a capacity of 60,000 pounds. The Olsen is better adapted for heavy work, such as testing paving stones and vitrified brick; the Riehlé, for making stone-dust briquettes and all lighter work.

#### POWER FOR OPERATING MACHINERY.

Of the various engines and motors in the laboratory, the one generally used for operating the machines described above is a 3 horse-power steam engine. On occasions when there is no steam, a  $3\frac{1}{2}$  horse-power gas engine is used.





## PETROGRAPHIC EXAMINATION OF SPECIMENS.

In order to determine the composition and classify samples of stone sent to the laboratory, it is in many cases necessary to make thin sections of the rock for petrographic examination. This work is done in the petrographical laboratory of the University, which is supplied with a diamond saw, a corundum saw and numerous grinding discs, all of which are run by a 5 horse-power electric motor. Here also the cubes of stone used in the impact and compression tests are sawed and shaped. This laboratory is also equipped with microscopes, specially adapted for determining the mineral composition of rocks.

## DESCRIPTION OF TABLES.

All that remains to be said is that the results of all the abrasion and cementation tests made up to the present time, and the petrographic determinations of such of the stones that required thin sections to be made, are given in the tables which conclude this report.

Table I. contains the results of all the abrasion and cementation tests which have been made up to the present time. These consist of 219 coefficients of wear and 116 cementation values, together with the localities from which the specimens of stone came, and their petrographic and popular names. It was necessary in many cases to study thin sections of the rocks in order to properly classify them.

Table II. in the first column gives alphabetically the localities from which the specimens came. Following the name of each locality, in the next two columns are given the number of the specimen and its petrographic and popular name. Next to these, and arranged in 26 columns, are the percentages of the various minerals of which each rock is composed. The small numerals 1 or 2 placed above the percentage figures denote respectively whether the mineral in question is primary or secondary, the primary minerals being the original minerals of the rock and the secondary those resulting from subsequent change. In some cases, in which the separate determination of two different minerals in the same rock is impracticable by the microscopic method employed, the total percentage of the two is given in one column, and a horizontal sinuous line connects it with the column representing the other mineral. It will doubtless prove interesting to road builders to know the mineral composition of the rocks used on the various roads, and to compare their composition with the results obtained from them.



TABLE I.

| LOCALITY OF STONE.      | Name of Stone.           | Number of Specimen. | Coefficient of Wear. | Percentage of Wear. | Concentration Value. | Used on State Highway. |
|-------------------------|--------------------------|---------------------|----------------------|---------------------|----------------------|------------------------|
| Acushnet, . . .         | Field stone (erratics),  | 205                 | 9.32                 | 4.29                | 9                    | 1897 lay-out.          |
| Amherst, . . .          | Diabase (trap), . .      | 78                  | 20.33                | 1.97                | 62                   |                        |
| Andover, . . .          | Mixed stone, . . .       | 210                 | 10.29                | 3.88                | 19                   | 1897 lay-out.          |
| Ashby, . . .            | Granite, . . .           | 60                  | 8.41                 | 4.76                | 6                    |                        |
| Ashby, . . .            | Field stone (erratics),  | 187                 | 5.43                 | 7.36                | 12                   | 1896 lay-out.          |
| Ashby, . . .            | Gneiss, . . .            | 118                 | 6.08                 | 6.57                | 1                    |                        |
| Ashby, . . .            | Field stone (erratics),  | 209                 | 7.31                 | 5.47                | 15                   | 1897 lay-out.          |
| Athol, . . .            | Biotite schist, . .      | 88                  | 12.52                | 3.19                | -                    |                        |
| Auburn, . . .           | Hornblende gneiss, .     | 203                 | 12.50                | 3.20                | 14                   | 1897 lay-out.          |
| Bedford, . . .          | Mixed stone, . . .       | 241                 | 16.69                | 2.40                | 14                   | 1897 lay-out.          |
| Bergen Hill, N. J., .   | Trap, . . .              | 249                 | 15.03                | 2.66                | 26                   |                        |
| Beverly, . . .          | Granitite, . . .         | 74                  | 21.16                | 1.90                | -                    |                        |
| Beverly, . . .          | Diabase (trap), . .      | 117                 | 16.71                | 2.39                | 14                   | 1895 lay-out.          |
| Beverly, . . .          | Hornblende granitite,    | 89                  | 17.48                | 2.29                | -                    |                        |
| Beverly, . . .          | Mixed stone, . . .       | 271                 | 19.13                | 2.09                | -                    | 1898 lay-out.          |
| Beverly, . . .          | Granite, . . .           | 62                  | 14.58                | 2.75                | 5                    |                        |
| Boston, . . .           | Felsite, . . .           | 40                  | 16.06                | 2.49                | -                    |                        |
| Boundbrook, N. J., .    | Basalt (trap), . .       | 252                 | 18.61                | 2.15                | 16                   |                        |
| Bourne, . . .           | Field stone (erratics),  | 275                 | 10.50                | 3.80                | -                    | 1898 lay-out.          |
| Boxborough, . . .       | Field stone (erratics),  | 231                 | 12.73                | 3.14                | -                    | 1897 lay-out.          |
| Branford, Conn., . .    | Trap, . . .              | 215                 | 18.80                | 2.19                | 34                   |                        |
| Brewster, . . .         | Field stone (erratics),  | 220                 | 15.77                | 2.54                | 38                   | 1897 lay-out.          |
| Bristol, R. I., . . .   | Field stone (erratics),  | 194                 | 10.45                | 3.82                | 16                   |                        |
| Brockton, . . .         | Hornblende granitite,    | 202                 | 18.42                | 2.17                | 14                   | 1897 lay-out.          |
| Brookline, . . .        | Diabase (trap), . .      | 7                   | 11.40                | 3.51                | -                    |                        |
| Brookline, . . .        | Diabase porphyry (trap). | 23                  | 14.71                | 2.72                | -                    |                        |
| Buckland, . . .         | Hornblende gneiss, .     | 50                  | 7.94                 | 5.04                | -                    |                        |
| Buckland, . . .         | Schist, . . .            | 52                  | 11.71                | 3.42                | -                    |                        |
| Byram Station, N. J., . | Basalt (trap), . .       | 251                 | 26.93                | 1.49                | 31                   |                        |
| Chester, . . .          | Schist, . . .            | 44                  | 12.21                | 3.27                | -                    |                        |
| Chester, . . .          | Corundum gneiss, .       | 46                  | 10.62                | 3.77                | -                    |                        |
| Clinton, . . .          | Gneiss, . . .            | 242                 | 8.27                 | 4.83                | 17                   |                        |
| Clinton, . . .          | Mica schist, . . .       | 243                 | 4.87                 | 8.20                | -                    |                        |
| Clinton, . . .          | Gneiss, . . .            | 244                 | 8.17                 | 4.89                | 12                   |                        |
| Clinton, . . .          | Gneiss, . . .            | 245                 | 9.00                 | 4.44                | 13                   |                        |
| Clinton, . . .          | -                        | 246                 | 10.23                | 3.91                | 15                   |                        |

TABLE I. — *Continued.*

| LOCALITY OF STONE.        | Name of Stone.            | Number of Specimen. | Coefficient of Wear. | Percentage of Wear. | Cementation Value. | Used on State Highway. |
|---------------------------|---------------------------|---------------------|----------------------|---------------------|--------------------|------------------------|
| Clinton, . . . .          | Felsite, . . . .          | 247                 | 16.07                | 2.49                | 64                 |                        |
| Clinton, . . . .          | Granitite, . . . .        | 279                 | 8.68                 | 4.60                | 8                  |                        |
| Cohasset, . . . .         | Broken gravel, . . . .    | 232                 | 13.24                | 3.01                | 10                 | 1897 lay-out.          |
| Concord, . . . .          | Field stone (erratics),   | 207                 | 14.15                | 2.83                | 13                 | 1897 lay-out.          |
| Concord, . . . .          | Field stone (erratics),   | 274                 | 11.59                | 3.45                | -                  | 1898 lay-out.          |
| Cortland, N. Y., . .      | Gabbro, . . . .           | 195                 | 7.46                 | 5.36                | 12                 |                        |
| Cottage City, . . . .     | Field stone (erratics),   | 197                 | 11.22                | 3.56                | 14                 | 1896 lay-out.          |
| Cumberland, R. I., . .    | Peridotite, . . . .       | 14                  | 9.42                 | 4.24                | -                  |                        |
| Cumberland, R. I., . .    | Quartzite, . . . .        | 42                  | 9.07                 | 4.41                | -                  |                        |
| Dartmouth, . . . .        | Granite, . . . .          | 77                  | 14.76                | 2.72                | 14                 |                        |
| Deerfield, . . . .        | Diabase (trap), . . . .   | 76                  | 28.57                | 1.40                | -                  |                        |
| Deerfield, . . . .        | Olivine diabase (trap),   | 268                 | 28.77                | 1.39                | -                  | 1895 lay-out.          |
| Dennis, . . . .           | Field stone (erratics),   | 180                 | 19.19                | 2.08                | 13                 | 1896 lay-out.          |
| Dennis, . . . .           | Field stone (erratics),   | 221                 | 15.98                | 2.50                | 6                  | 1897 lay-out.          |
| Dennis, . . . .           | Field stone (erratics),   | 258                 | 14.11                | 2.90                | 20                 | 1898 lay-out.          |
| Duanesburgh, N. Y., .     | Sandstone, . . . .        | 94                  | 10.53                | 3.80                | 13                 |                        |
| Duxbury, . . . .          | Gneiss, . . . .           | 5                   | 13.46                | 2.97                | 7                  |                        |
| Duxbury, . . . .          | Field stone (erratics),   | 217                 | 9.21                 | 4.34                | 16                 | 1897 lay-out.          |
| East Providence, R. I., . | Grit (carboniferous?),    | 43                  | 9.57                 | 4.18                | -                  |                        |
| East Providence, R. I., . | Grit (carboniferous?),    | 48                  | 13.42                | 2.98                | -                  |                        |
| Edgartown, . . . .        | Field stone (erratics),   | 235                 | 8.70                 | 4.60                | 23                 | 1897 lay-out.          |
| Fitchburg, . . . .        | Granite, . . . .          | 256                 | 17.90                | 2.23                | 12                 | 1897 lay-out.          |
| Florida, . . . .          | Styatyte, . . . .         | 119                 | 2.02                 | 19.78               | 0                  |                        |
| Florida, . . . .          | Mixed stone, . . . .      | 120                 | 6.70                 | 5.96                | 19                 |                        |
| Glen Mills, Pa., . .      | Metamorphic sandstone.    | 254                 | 14.48                | 2.76                | 20                 |                        |
| Gloucester, . . . .       | Hornblende granitite,     | 26                  | 11.03                | 3.63                | -                  |                        |
| Gloucester, . . . .       | Augite nepheline syenite. | 30                  | 12.63                | 3.17                | -                  |                        |
| Gloucester, . . . .       | - -                       | 170                 | 13.34                | 3.00                | 5                  | 1895 lay-out.          |
| Gloucester, . . . .       | Mixed stone, . . . .      | 272                 | 11.29                | 3.54                | -                  | 1898 lay-out.          |
| Gordon County, Ga., .     | Chert, . . . .            | 38                  | 8.35                 | 4.79                | -                  |                        |
| Grafton, . . . .          | Field stone (erratics),   | 223                 | 14.84                | 3.37                | 20                 | 1897 lay-out.          |
| Great Barrington, . .     | Limestone, . . . .        | 47                  | 9.52                 | 4.20                | -                  |                        |
| Great Barrington, . .     | Blotite gneiss, . . . .   | 80                  | 14.62                | 2.74                | 28                 |                        |
| Great Notch, N. J., .     | Diabase (trap), . . . .   | 260                 | 21.76                | 1.84                | 40                 |                        |
| Great Notch, N. J., .     | Diabase (trap), . . . .   | 261                 | 18.59                | 2.15                | 36                 |                        |
| Guttenberg, N. J., . .    | Basalt (trap), . . . .    | 73                  | 30.40                | 1.31                | -                  |                        |

TABLE I.—*Continued.*

| LOCALITY OF STONE.             | Name of Stone.          | Number of Specimen. | Coefficient of Wear. | Percentage of Wear. | Cementation Value. | Used on State Highway.    |
|--------------------------------|-------------------------|---------------------|----------------------|---------------------|--------------------|---------------------------|
| Haverstraw, N. Y., .           | Diabase (trap), . .     | 49                  | 14.91                | 2.68                | -                  |                           |
| Hingham, . . . .               | Mixed stone, . .        | 182                 | 15.60                | 2.56                | 19                 | 1896 lay-out.             |
| Hingham, . . . .               | Mixed stone, . .        | 240                 | 13.61                | 2.94                | 17                 | 1897 lay-out.             |
| Holbrook and Weymouth,         | Field stone, . .        | 259                 | 10.06                | 3.97                | 16                 | 1894-96 lay-outs.         |
| Holden, . . . .                | Field stone (erratics), | 185                 | 6.58                 | 6.08                | -                  | 1896 lay-out.             |
| Holyoke, . . . .               | Diabase (trap), . .     | 66                  | 19.67                | 2.02                | -                  |                           |
| Howe's Cove, N. Y., .          | Limestone, . . .        | 188                 | 9.64                 | 4.15                | 23                 |                           |
| Ipswich, . . . .               | Diabase (trap), . .     | 61                  | 24.05                | 1.66                | -                  |                           |
| Ipswich, . . . .               | Hornblende granite,     | 116                 | 18.39                | 2.17                | 77                 |                           |
| Johnston, R. I., . .           | - -                     | 191                 | 21.41                | 1.87                | 18                 |                           |
| Lambertville, N. J., .         | Hornblende granite,     | 253                 | 14.20                | 2.82                | 25                 |                           |
| Lawrence, . . . .              | Limestone, . . .        | 65                  | 17.20                | 2.33                | 10                 |                           |
| Lawrence, . . . .              | Slaty sandstone, .      | 222                 | 19.00                | 2.10                | 8                  | 1896 lay-out.             |
| Lee, . . . .                   | Marble, . . . .         | 101                 | 2.85                 | 14.01               | -                  |                           |
| Lee, . . . .                   | Quartzite, . . .        | 104                 | 11.65                | 3.43                | -                  |                           |
| Lee, . . . .                   | Schist, . . . .         | 41                  | 12.15                | 3.29                | -                  |                           |
| Lee, . . . .                   | Biotite schist, . .     | 51                  | 11.43                | 3.50                | -                  |                           |
| Lee, . . . .                   | Quartzite, . . .        | 121                 | 11.69                | 3.42                | -                  |                           |
| Leicester, . . . .             | Field stone (erratics), | 267                 | 11.17                | 3.58                | -                  | 1898 lay-out.             |
| Lenox, . . . .                 | Epidote gneiss, . .     | 10                  | 8.04                 | 4.98                | -                  |                           |
| Lexington, . . . .             | Field stone (erratics), | 264                 | 11.36                | 3.52                | -                  | 1898 lay-out.             |
| Lincoln, . . . .               | Field stone (erratics), | 172                 | 12.86                | 3.11                | 8                  | 1896 lay-out.             |
| Lockport, N. Y., . .           | Medina sandstone, .     | 193                 | 17.48                | 2.29                | 10                 |                           |
| Lynn, . . . .                  | Diabase (trap), . .     | 16                  | 19.77                | 2.02                | -                  |                           |
| Lynn, . . . .                  | Diabase (trap), . .     | 21                  | 20.37                | 1.96                | -                  |                           |
| Lynn, . . . .                  | Felsite, . . . .        | 24                  | 14.66                | 2.73                | -                  |                           |
| Lynn, . . . .                  | Felsite, . . . .        | 27                  | 12.30                | 3.25                | -                  |                           |
| Lynn, . . . .                  | Diabase (trap), . .     | 29                  | 18.17                | 2.20                | -                  |                           |
| Malden, . . . .                | Diabase (trap), . .     | 270                 | 18.86                | 2.12                | -                  | 1897, 2d lay-out, Revere. |
| Malden, . . . .                | Hornblende granite,     | 125                 | 14.09                | 2.84                | 16                 |                           |
| Marion, . . . .                | Mixed stone, . .        | 113                 | 9.95                 | 4.02                | -                  |                           |
| Marion, . . . .                | Field stone (erratics), | 201                 | 8.44                 | 4.73                | 7                  | 1897 lay-out.             |
| Marlborough and North-borough. | Field stone (erratics), | 255                 | 13.67                | 2.92                | 20                 | 1897 lay-out.             |
| Marshfield, . . . .            | Field stone (erratics), | 179                 | 7.90                 | 5.05                | 22                 | 1894 and 1896 lay-outs.   |
| Mattapoisett, . . . .          | Field stone (erratics), | 106                 | 8.78                 | 4.55                | -                  |                           |
| Medford, . . . .               | Diabase (trap), . .     | 20                  | 15.82                | 2.53                | -                  |                           |

TABLE I.—*Continued.*

| LOCALITY OF STONE.     | Name of Stone.           | Number of Specimen. | Coefficient of Wear. | Percentage of Wear. | Cementation Value. | Used on State Highway. |
|------------------------|--------------------------|---------------------|----------------------|---------------------|--------------------|------------------------|
| Meriden, Conn., . . .  | Diabase (trap), . . .    | 11                  | 12.50                | 3.20                | -                  |                        |
| Meriden, Conn., . . .  | Diabase (trap), . . .    | 71                  | 15.49                | 2.58                | 28                 |                        |
| Methuen, . . . . .     | Sandstone (siliceous),   | 181                 | 14.00                | 2.86                | 11                 | 1896 lay-out.          |
| Methuen, . . . . .     | Sandstone (siliceous),   | 226                 | 18.68                | 2.14                | 12                 | 1896 lay-out.          |
| Merrimac, . . . . .    | Field stone (erratics),  | 238                 | 14.16                | 2.82                | 15                 | 1897 lay-out.          |
| Middleborough, . . .   | Field stone (erratics),  | 177                 | 7.99                 | 5.00                | 12                 | 1896 lay-out.          |
| Middleborough, . . .   | Field stone (erratics),  | 214                 | 11.14                | 3.59                | 15                 | 1897 lay-out.          |
| Middleborough, . . .   | Field stone (erratics),  | 269                 | 13.28                | 3.01                | -                  | 1898 lay-out.          |
| Millville, . . . . .   | Hornblende granite,      | 227                 | 14.75                | 2.71                | -                  |                        |
| Milton, . . . . .      | Diabase (trap), . . .    | 196                 | 25.73                | 1.55                | 14                 |                        |
| Milton, . . . . .      | Diabase porphyry (trap). | 218                 | 20.97                | 1.91                | -                  |                        |
| Milton, . . . . .      | Diabase (trap), . . .    | 219                 | 22.77                | 1.75                | 34                 |                        |
| Monson, . . . . .      | Diabase, . . . . .       | 68                  | 22.13                | 1.80                | 20                 |                        |
| Nantucket, . . . . .   | Field stone (erratics),  | 108                 | 9.47                 | 4.22                | 7                  |                        |
| Newbury, . . . . .     | Diabase porphyry (trap). | 31                  | 20.40                | 1.96                | -                  |                        |
| Newbury, . . . . .     | Hornblende granite,      | 35                  | 14.45                | 2.77                | -                  |                        |
| Newburyport, . . . .   | Diabase (trap), . . .    | 37                  | 16.10                | 2.48                | -                  |                        |
| Newburyport, . . . .   | Mixed stone, . . . .     | 225                 | 16.52                | 2.42                | -                  | 1897 lay-out.          |
| Newburyport, . . . .   | Mixed stone, . . . .     | 277                 | 11.01                | 3.63                | -                  | 1898 lay-out.          |
| Newport, R. I., . . .  | Quartzite, . . . . .     | 189                 | 20.34                | 1.97                | 14                 |                        |
| Newton, . . . . .      | Trachyte (trap), . .     | 6                   | 20.79                | 1.92                | -                  |                        |
| Newton, . . . . .      | Conglomerate, . . .      | 107                 | 8.67                 | 4.61                | -                  |                        |
| Norfolk, . . . . .     | Field stone (erratics),  | 204                 | 13.20                | 3.03                | 11                 | 1895 lay-out.          |
| North Attleborough, .  | Field stone (erratics),  | 126                 | 9.09                 | 4.40                | -                  |                        |
| Northampton, . . . .   | Gneiss, . . . . .        | 8                   | 10.69                | 3.74                | -                  |                        |
| Norwood, . . . . .     | Field stone (erratics),  | 176                 | 13.20                | 3.03                | 14                 | 1896 lay-out.          |
| Orange, . . . . .      | Hornblende granite,      | 211                 | 9.78                 | 4.08                | -                  |                        |
| Orange, . . . . .      | Hornblende gneiss, .     | 39                  | 10.26                | 3.90                | 9                  | 1897 lay-out.          |
| Paxton, . . . . .      | Granitoid gneiss, . .    | 111                 | 5.01                 | 7.98                | -                  |                        |
| Paxton, . . . . .      | Field stone (erratics),  | 234                 | 8.48                 | 4.72                | 8                  | 1897 lay-out.          |
| Pittsfield, . . . . .  | Limestone, . . . . .     | 102                 | 9.38                 | 4.26                | -                  |                        |
| Pittsfield, . . . . .  | Biotite schist, . . .    | 69                  | 9.77                 | 4.09                | -                  |                        |
| Plymouth, . . . . .    | Field stone (erratics),  | 110                 | 10.10                | 3.96                | -                  |                        |
| Princeton, . . . . .   | Field stone (erratics),  | 208                 | 10.47                | 3.81                | 23                 | 1897 lay-out.          |
| Providence, R. I., . . | Grit (carboniferous?),   | 36                  | 10.02                | 3.99                | -                  |                        |
| Quincy, . . . . .      | Granite, . . . . .       | 17                  | 10.16                | 3.94                | -                  |                        |

TABLE I. — *Continued.*

| LOCALITY OF STONE.      | Name of Stone.             | Number of Specimen. | Coefficient of Wear. | Percentage of Wear. | Cementation Value. | Used on State Highway.  |
|-------------------------|----------------------------|---------------------|----------------------|---------------------|--------------------|-------------------------|
| Quincy, . . . .         | Diabase porphyry (trap).   | 18                  | 15.21                | 2.63                | -                  |                         |
| Quincy, . . . .         | Felsite, . . . .           | 72                  | 19.91                | 2.01                | 17                 |                         |
| Quincy, . . . .         | Diabase (trap), . . .      | 230                 | 25.56                | 1.56                | -                  |                         |
| Quincy, . . . .         | - -                        | 278                 | 15.03                | 2.66                | -                  |                         |
| Rehoboth, . . . .       | Field stone (erratics),    | 224                 | 11.96                | 3.34                | 27                 | 1896 lay-out.           |
| Revere, . . . .         | Felsite porphyry, . .      | 3                   | 13.21                | 3.03                | -                  |                         |
| Revere, . . . .         | Felsite, . . . .           | 124                 | 15.21                | 2.63                | 25                 |                         |
| Rockland Lake, N. Y., . | Diabase (coarse, trap),    | 95                  | 17.79                | 2.25                | 13                 |                         |
| Rockport, . . . .       | Granite, . . . .           | 34                  | 12.57                | 3.18                | -                  |                         |
| Rockport, Me., . . .    | Limestone, . . . .         | 53                  | 8.26                 | 4.85                | 10                 |                         |
| Rockport, Me., . . .    | Limestone, . . . .         | 54                  | 9.00                 | 4.45                | -                  |                         |
| Rockport, Me., . . .    | Quartzite, . . . .         | 55                  | 14.60                | 2.74                | -                  |                         |
| Rockport, Me., . . .    | Schist, . . . .            | 123                 | 9.58                 | 4.17                | 16                 |                         |
| Rocky Hill, Conn., . .  | Trap, . . . .              | 233                 | 16.97                | 2.36                | 22                 |                         |
| Rocky Hill, N. J., . .  | Hornblende granite,        | 248                 | 19.44                | 2.06                | 16                 |                         |
| Round Island, N. Y., .  | Gneiss, . . . .            | 192                 | 23.02                | 1.73                | -                  |                         |
| Rowley, . . . .         | Felsite (brecciated), .    | 97                  | 12.32                | 3.25                | 101                |                         |
| Salem, . . . .          | Augite diorite (trap),     | 1                   | 15.55                | 2.57                | -                  |                         |
| Salem, . . . .          | Diabase (trap), . . .      | 115                 | 14.34                | 2.79                | -                  |                         |
| Salisbury, . . . .      | Camptonite, . . . .        | 33                  | 16.76                | 2.39                | -                  |                         |
| Sandwich, . . . .       | Field stone (erratics),    | 200                 | 11.52                | 3.47                | 29                 | 1897 lay-out.           |
| Saugus, . . . .         | Diabase (trap), . . .      | 25                  | 16.02                | 2.50                | -                  |                         |
| Saugus, . . . .         | Diabase (trap), . . .      | 22                  | 16.08                | 2.49                | -                  |                         |
| Saugus, . . . .         | Diabase (trap), . . .      | 28                  | 18.25                | 2.19                | -                  |                         |
| Saugus, . . . .         | Granite, . . . .           | 15                  | 8.99                 | 4.45                | -                  |                         |
| Saugus, . . . .         | Diabase (trap), . . .      | 32                  | 21.22                | 1.89                | -                  |                         |
| Shrewsbury, . . . .     | Mixed stone, . . . .       | 178                 | 13.48                | 2.97                | 19                 | 1896 lay-out.           |
| Shrewsbury, . . . .     | Field stone (erratics),    | 213                 | 12.32                | 3.25                | 24                 | 1897 lay-out.           |
| Somerset, . . . .       | Field stone (erratics),    | 175                 | 11.88                | 3.37                | 13                 | 1895 and 1896 lay-outs. |
| Somerset, . . . .       | Field stone, . . . .       | 216                 | 11.53                | 3.47                | 20                 | 1897 lay-out.           |
| Somerville, . . . .     | Slate (Cambrian?), . .     | 103                 | 8.48                 | 4.72                | -                  |                         |
| Somerville, . . . .     | Diabase (trap), . . .      | 19                  | 9.28                 | 4.31                | -                  |                         |
| Sterling, . . . .       | Hornblende syenite (trap). | 83                  | 19.77                | 2.07                | -                  | 1897 lay-out.           |
| Sterling, . . . .       | Hornblende syenite (trap). | 265                 | 17.09                | 2.34                | 11                 |                         |
| Tisbury, . . . .        | Field stone (erratics),    | 109                 | 8.88                 | 4.51                | -                  |                         |
| Tompin's Cove, N. Y., . | Limestone (siliceous),     | 127                 | 6.31                 | 6.34                | -                  |                         |
| Tompin's Cove, N. Y., . | Limestone (siliceous),     | 45                  | 7.84                 | 5.10                | -                  |                         |
| Uxbridge, . . . .       | Hornblende granitite,      | 63                  | 12.62                | 3.17                | 10                 |                         |



TABLE I. — *Concluded.*

| LOCALITY OF STONE.       | Name of Stone.                 | Number of Specimen. | Coefficient of Wear. | Percentage of Wear. | Cementation Value. | Used on State Highway.          |
|--------------------------|--------------------------------|---------------------|----------------------|---------------------|--------------------|---------------------------------|
| Uxbridge, . . .          | Field stone (erratics),        | 239                 | 10.44                | 3.83                | 9                  | 1897 lay-out.                   |
| Walpole, . . .           | Conglomerate, . . .            | 70                  | 11.57                | 3.46                | 12                 | 1895 lay-out.                   |
| Walpole, . . .           | Field stone (erratics),        | 229                 | 16.47                | 2.43                | 27                 | 1897 lay-out.                   |
| Walpole, . . .           | Field stone (erratics),        | 276                 | 14.28                | 2.80                | -                  | 1898 lay-out.                   |
| Waltham, . . .           | Granite, . . .                 | 4                   | 12.16                | 3.29                | 7                  |                                 |
| Ware, . . .              | Diabase (trap), . . .          | 64                  | 23.31                | 1.72                | -                  |                                 |
| Warcham, . . .           | Field stone (erratics),        | 257                 | 6.80                 | 5.87                | -                  |                                 |
| Warren, R. I., . . .     | Field stone (erratics),        | 193                 | 11.88                | 3.37                | 23                 |                                 |
| Warwick, R. I., . . .    | Field stone (erratics),        | 190                 | 10.71                | 3.72                | 18                 |                                 |
| Watertown, . . .         | Mixed stone, . . .             | 183                 | 12.15                | 3.29                | 20                 |                                 |
| Watertown, . . .         | Field stone (erratics),        | 174                 | 16.74                | 2.39                | 8                  | 1895 and 1896 lay-outs.         |
| Watertown, . . .         | Diabase (trap), . . .          | 96                  | 13.70                | 2.92                | -                  |                                 |
| Plainfield, Conn., . . . | Trap, . . .                    | 206                 | 22.23                | 1.80                | -                  |                                 |
| West Auburn, . . .       | Limestone, . . .               | 114                 | 12.01                | 3.33                | 17                 |                                 |
| Westminster, . . .       | Field stone (erratics),        | 199                 | 8.34                 | 4.80                | -                  | 1897 lay-out.                   |
| West Newbury, . . .      | Field stone (erratics),        | 186                 | 10.11                | 3.95                | 14                 | 1896 lay-out.                   |
| West Newbury, . . .      | Field stone (erratics),        | 228                 | 13.27                | 3.01                | 15                 | 1897 lay-out.                   |
| Westport, . . .          | Hornblende granitite, . . .    | 81                  | 14.18                | 2.82                | 21                 | 1897 lay-out.                   |
| Westport, . . .          | Field stone (erratics),        | 262                 | 11.42                | 3.50                | 13                 | 1898 lay-out.                   |
| Westport, . . .          | Hornblende granitite, . . .    | 122                 | 14.20                | 2.82                | 29                 |                                 |
| West Springfield, . . .  | Diabase (trap), . . .          | 12                  | 15.60                | 2.56                | -                  |                                 |
| West Springfield, . . .  | Diabase porphyry (trap), . . . | 67                  | 22.14                | 1.81                | 17                 |                                 |
| West Springfield, . . .  | Diabase (trap), . . .          | 91                  | 24.99                | 1.60                | 33                 |                                 |
| West Springfield, . . .  | Diabase (trap), . . .          | 93                  | 21.60                | 1.85                | -                  |                                 |
| West Tisbury, . . .      | Field stone (erratics),        | 175                 | 8.40                 | 4.76                | 10                 | 1896 lay-out.                   |
| West Tisbury, . . .      | Field stone (erratics),        | 198                 | 6.76                 | 5.91                | 7                  | 1897 lay-out.                   |
| Weymouth, . . .          | Felsite, . . .                 | 92                  | 14.52                | 2.75                | 16                 |                                 |
| Whitman, . . .           | Field stone (erratics),        | 105                 | 5.93                 | 6.75                | -                  |                                 |
| Wilmington, N. J., . . . | Trap, . . .                    | 250                 | 19.64                | 2.04                | 53                 |                                 |
| Williamstown, . . .      | Field stone (erratics),        | 273                 | 11.66                | 3.43                | -                  | 1898 lay-out.                   |
| Worcester, . . .         | Field stone (erratics),        | 184                 | 11.83                | 3.38                | 46                 | 1896 lay-out.                   |
| Worcester, . . .         | Field stone (erratics),        | 212                 | 10.46                | 3.82                | 32                 | 1897 lay-out.                   |
| Worcester, . . .         | Field stone (erratics),        | 263                 | 9.12                 | 4.38                | -                  | Worcester-Holden, 1897 lay-out. |
| Worcester, . . .         | Hornblende granitite, . . .    | 266                 | 8.62                 | 4.64                | -                  |                                 |
| Wrentham, . . .          | Field stone (erratics),        | 236                 | 12.18                | 3.28                | 24                 | 1897 lay-out.                   |
| Yarmouth, . . .          | Field stone (erratics),        | 171                 | 11.99                | 3.34                | 28                 | 1896 lay-out.                   |
| Yarmouth, . . .          | Field stone (erratics),        | 237                 | 16.81                | 2.38                | 28                 | 1897 lay-out.                   |

TABLE

|    | LOCALITY                           | NUMBER OF SPECIMEN | SCIENTIFIC NAME    | COMMON NAME   | Percent of Olivine | Percent of Plagioclase | Percent of Quartz | Percent of Hornblende | Percent of Augite |
|----|------------------------------------|--------------------|--------------------|---------------|--------------------|------------------------|-------------------|-----------------------|-------------------|
| 1  | AMHERST                            | 78                 | Diabase            | Trap          | 50'                |                        |                   | 40'                   |                   |
| 2  | AMHERST                            | 82                 | Augite Diabase     | Trap          | 40'                |                        |                   | 50'                   |                   |
| 3  | ATHOL                              | 83                 | Schist             | Schist        |                    |                        | 80'               |                       |                   |
| 4  | BEVERLY                            | 74                 | Augite Granite     | Granite       | 40'                | 20'                    | 20'               |                       |                   |
| 5  | BEVERLY                            | 89                 | Hornblende Granite | Granite       | 40'                | 10'                    | 30'               | 10'                   |                   |
| 6  | BEVERLY                            | 62                 | Granite            | Granite       | 50'                | 10'                    | 20'               | 8'                    |                   |
| 7  | BOSTON                             | 40                 | Felsite            | Porphyry      | 90'                |                        | 8'                |                       |                   |
| 8  | BROOKLINE                          | 7                  | Hornblende Diorite | Trap          | 40'                |                        |                   |                       |                   |
| 9  | BROOKLINE                          | 23                 | Olivine Diabase    | Trap          | 45'                | 10'                    |                   |                       |                   |
| 10 | CALIFORNIA                         | 79                 | Trachyte           | Trap          | 95'                |                        | 5'                |                       |                   |
| 11 | CUMBERLAND RI <sup>IRON HILL</sup> | 14                 | Peridotite         | Peridotite    | 50'                |                        |                   |                       |                   |
| 12 | DARTMOUTH                          | 77                 | Gneiss             | Gneiss        | 55'                |                        | 30'               |                       |                   |
| 13 | DEERFIELD                          | 76                 | Olivine Diabase    | Trap          | 65'                |                        |                   |                       |                   |
| 14 | DUANESBURG, NY                     | 94                 | Conglomerate       | Pudding Stone |                    |                        |                   |                       |                   |
| 15 | DUXBURY                            | 5                  | Gneiss             | Gneiss        | 40'                |                        | 50'               |                       |                   |
| 16 | EVERETT                            | 2                  | Olivine Diabase    | Trap          | 40'                |                        | 3 <sup>2</sup>    |                       |                   |
| 17 | GT. BARRINGTON                     | 80                 | Schist             | Schist        |                    |                        | 60'               |                       |                   |
| 18 | GT. BARRINGTON                     | 98                 | Schist             | Schist        | 65'                |                        |                   |                       |                   |
| 19 | GUTTENBURG, N.J.                   | 73                 | Basalt             | Trap          | 50'                |                        |                   | 40'                   |                   |
| 20 | HAVERSTRAW, NY                     | 49                 | Diabase            | Trap          | 50'                |                        |                   | 40'                   |                   |
| 21 | HOLYOKE                            | 66                 | Diabase            | Trap          | 50'                |                        |                   | 40'                   |                   |
| 22 | HYDE PARK                          | 9                  | Diabase            | Trap          | 35'                |                        |                   | 30'                   |                   |
| 23 | LEE                                | 51                 | Schist             | Schist        |                    |                        | 40'               | 7'                    |                   |
| 24 | LENOX                              | 10                 | Sericite Schist    | Schist        |                    |                        | 25'               |                       |                   |
| 25 | LYNN                               | 21                 | Augite Diabase     | Trap          | 40'                |                        |                   | 40'                   |                   |
| 26 | LYNN                               | 24                 | Felsite            | Porphyry      | 95'                |                        |                   |                       |                   |
| 27 | LYNN                               | 27                 | Felsite            | Porphyry      | 85'                |                        | 5'                |                       |                   |
| 28 | LYNN                               | 29                 | Augite Diabase     | Trap          | 40'                |                        |                   | 30'                   |                   |
| 29 | MARION                             | 13                 | Gneiss             | Gneiss        | 30'                |                        | 30'               |                       |                   |
| 30 | MERIDEN, CONN                      | 11                 | Augite Diabase     | Trap          | 50'                |                        |                   | 10'                   |                   |
| 31 | MEDFORD                            | 20                 | Olivine Diabase    | Trap          | 50'                |                        | 3'                |                       |                   |
| 32 | MONSON                             | 68                 | Diabase            | Trap          | 55'                |                        |                   | 40'                   |                   |
| 33 | NEWBURY                            | 31                 | Diabase            | Trap          | 60'                |                        |                   | 35'                   |                   |
| 34 | NEWBURY                            | 35                 | Hornblende Diorite | Trap          | 40'                |                        | 10'               | 40'                   |                   |
| 35 | NEWBURYPORT                        | 37                 | Gneiss             | Gneiss        | 40'                |                        | 40'               |                       |                   |
| 36 | NEWTON                             | 6                  | Diabase            | Trap          | 50'                |                        | 5 <sup>2</sup>    |                       |                   |
| 37 | NORTHAMPTON                        | 8                  | Gneiss             | Gneiss        | 50'                |                        | 25'               |                       |                   |
| 38 | PITTSFIELD                         | 69                 | Biotite Schist     | Schist        |                    |                        | 30'               |                       |                   |

| II                   |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|----------------------|--------------------|--------------------|--------------------|--------------------|---------------------|-----------------------|--------------------|-------------------|----------------------|-----------------------|-------------------|---------------------|--------------------------|---------------------|-------------------|
| Percent of Magnetite | Percent of Apatite | Percent of Calcite | Percent of Olivine | Percent of Biotite | Percent of Chlorite | Percent of Serpentine | Percent of Epidote | Percent of Pyrite | Percent of Muscovite | Percent of Microcline | Percent of Garnet | Percent of Titanite | Percent of Microperthite | Percent of Hematite | Percent of Zircon |
| 5 <sup>2</sup>       |                    |                    |                    |                    | 5 <sup>2</sup>      |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 10 <sup>1</sup>      |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    | 15 <sup>1</sup>    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 5 <sup>1</sup>       |                    |                    |                    | 10 <sup>1</sup>    |                     |                       |                    |                   |                      |                       |                   | 5 <sup>1</sup>      |                          |                     |                   |
| 5 <sup>1</sup>       |                    |                    |                    | 5 <sup>1</sup>     |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    | 10 <sup>1</sup>    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    |                    |                     |                       |                    | 2 <sup>1</sup>    |                      |                       |                   |                     |                          |                     |                   |
| 15 <sup>2</sup>      |                    |                    |                    |                    | 40 <sup>2</sup>     |                       |                    | 5 <sup>1</sup>    |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    |                    | 35 <sup>2</sup>     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 15 <sup>2</sup>      |                    |                    |                    |                    | 35 <sup>2</sup>     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 2 <sup>1</sup>       | 1 <sup>1</sup>     |                    |                    |                    |                     |                       |                    | 3 <sup>1</sup>    | 5 <sup>1</sup>       | 3 <sup>1</sup>        |                   |                     |                          |                     |                   |
| 10 <sup>2</sup>      |                    |                    |                    | 20 <sup>1</sup>    | 5 <sup>2</sup>      |                       |                    |                   |                      |                       |                   |                     |                          |                     | 1 <sup>1</sup>    |
|                      |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    |                    | 10 <sup>2</sup>     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 10 <sup>2</sup>      | 2 <sup>1</sup>     |                    |                    | 15 <sup>1</sup>    | 20 <sup>1</sup>     | 10 <sup>2</sup>       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    | 20 <sup>1</sup>    |                     |                       |                    | 20 <sup>1</sup>   |                      |                       |                   |                     |                          |                     |                   |
|                      | 3 <sup>1</sup>     |                    |                    | 20 <sup>1</sup>    |                     |                       | 5 <sup>1</sup>     | 7 <sup>1</sup>    |                      |                       |                   |                     |                          |                     |                   |
| 10 <sup>1</sup>      |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 5 <sup>2</sup>       |                    |                    |                    |                    |                     | 5 <sup>2</sup>        |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 10 <sup>1</sup>      |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 10 <sup>1</sup>      | 3 <sup>1</sup>     |                    |                    | 12 <sup>1</sup>    | 10 <sup>1</sup>     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 5 <sup>1</sup>       |                    |                    |                    | 30 <sup>1</sup>    |                     |                       | 10 <sup>1</sup>    | 5 <sup>1</sup>    | 3 <sup>1</sup>       |                       |                   |                     |                          |                     |                   |
| 5 <sup>1</sup>       |                    |                    |                    | 3 <sup>1</sup>     | 5 <sup>1</sup>      |                       |                    | 60 <sup>1</sup>   | 2 <sup>1</sup>       |                       |                   |                     |                          |                     |                   |
| 8 <sup>2</sup>       |                    |                    |                    |                    | 12 <sup>2</sup>     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 5 <sup>1</sup>       |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 10 <sup>2</sup>      |                    |                    |                    |                    | 20 <sup>2</sup>     |                       |                    |                   |                      |                       |                   |                     |                          | 10 <sup>1</sup>     |                   |
|                      |                    |                    |                    | 10 <sup>1</sup>    |                     |                       | 4 <sup>2</sup>     |                   | 25 <sup>1</sup>      | 1 <sup>1</sup>        |                   |                     |                          |                     |                   |
| 10 <sup>1</sup>      | 5 <sup>2</sup>     |                    |                    |                    | 25 <sup>2</sup>     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 10 <sup>2</sup>      |                    |                    |                    | 5 <sup>1</sup>     | 30 <sup>2</sup>     |                       |                    | 2 <sup>2</sup>    |                      |                       |                   |                     |                          |                     |                   |
| 5 <sup>1</sup>       |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
|                      |                    |                    |                    |                    |                     |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 2 <sup>2</sup>       |                    |                    |                    |                    | 3 <sup>2</sup>      |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 2 <sup>1</sup>       | 1 <sup>1</sup>     | 4 <sup>2</sup>     |                    |                    |                     |                       |                    |                   |                      |                       | 3 <sup>1</sup>    |                     |                          |                     |                   |
|                      |                    |                    |                    |                    | 12 <sup>2</sup>     |                       | 7 <sup>2</sup>     | 1 <sup>2</sup>    |                      |                       |                   |                     |                          |                     |                   |
| 10 <sup>2</sup>      |                    |                    |                    |                    | 25 <sup>2</sup>     |                       | 10 <sup>2</sup>    |                   |                      |                       |                   |                     |                          |                     |                   |
| 8 <sup>2</sup>       |                    | 10 <sup>2</sup>    |                    |                    | 7 <sup>2</sup>      |                       |                    |                   |                      |                       |                   |                     |                          |                     |                   |
| 5 <sup>1</sup>       |                    | 20 <sup>2</sup>    |                    | 20 <sup>1</sup>    |                     |                       |                    | 25 <sup>1</sup>   |                      |                       |                   |                     |                          |                     |                   |

| TABLE |                     |                    |                    |               |                        |                             |                    |                        |                    |
|-------|---------------------|--------------------|--------------------|---------------|------------------------|-----------------------------|--------------------|------------------------|--------------------|
|       | LOCALITY            | NUMBER OF SPECIMEN | SCIENTIFIC NAME    | COMMON NAME   | Per cent of Orthoclase | Per cent of Alkali feldspar | Per cent of Quartz | Per cent of Hornblende | Per cent of Augite |
| 39    | PROVIDENCE R.I.     | 36                 | Conglomerate       | Pudding Stone |                        |                             |                    |                        |                    |
| 40    | QUINCY              | 17                 | Hornblende Granite | Granite       | 75                     |                             | 20                 | 5                      |                    |
| 41    | QUINCY              | 18                 | Diabase Porphyry   | Trap          |                        | 50                          |                    |                        |                    |
| 42    | QUINCY              | 72                 | Felsite            | Porphyry      | 80                     |                             | 5                  |                        |                    |
| 43    | REVERE              | 3                  | Felsite Porphyry   | Porphyry      | 95                     |                             | 2                  |                        |                    |
| 44    | ROCKLAND LAKE, N.Y. | 95                 | Augite Diabase     | Trap          |                        | 50                          |                    |                        | 30                 |
| 45    | ROCKPORT            | 34                 | Hornblende Granite | Granite       | 75                     |                             | 23                 |                        |                    |
| 46    | ROUND ISLAND, N.Y.  | 100                | Gneiss             | Gneiss        | 15                     |                             | 15                 | 10                     |                    |
| 47    | ROWLEY              | 97                 | Felsite            | Porphyry      | 95                     |                             |                    |                        |                    |
| 48    | SALEM               | 1                  | Augite Diorite     | Trap          | 50                     |                             |                    | 20                     | 16                 |
| 49    | SALISBURY           | 33                 | Camptonite         | Trap          |                        | 60                          |                    | 25                     |                    |
| 50    | SAUGUS              | 15                 | Hornblende Granite | Granite       | 30                     |                             | 55                 |                        |                    |
| 51    | SAUGUS              | 22                 | Augite Diabase     | Trap          |                        | 45                          |                    |                        | 35                 |
| 52    | SAUGUS              | 25                 | Augite Diabase     | Trap          |                        | 40                          |                    |                        | 30                 |
| 53    | SAUGUS              | 28                 | Olivine Diabase    | Trap          |                        | 40                          |                    |                        | 20                 |
| 54    | SAUGUS              | 32                 | Hornblende Granite | Granite       | 35                     | 10                          | 50                 | 5                      |                    |
| 55    | SAUGUS              | 32 <sup>A</sup>    | Diabase            | Trap          |                        | 50                          |                    |                        | 25                 |
| 56    | SAUGUS              | 84                 | Olivine Diabase    | Trap          |                        | 50                          |                    |                        |                    |
| 57    | SAUGUS              | 83                 | Peridotite         | Peridotite    | 60                     |                             |                    |                        |                    |
| 58    | SAUGUS              | 86                 | Felsite            | Porphyry      | 90                     |                             |                    |                        |                    |
| 59    | SAUGUS              | 87                 | Felsite            | Porphyry      | 95                     |                             | 5                  |                        |                    |
| 60    | SAUGUS              | 90                 | Trachyte           | Trap          | 80                     |                             |                    |                        |                    |
| 61    | SOMERVILLE          | 75                 | Olivine Diabase    | Trap          |                        | 45                          |                    |                        |                    |
| 62    | STERLING            | 85                 | Hornblende Syenite | Trap          | 55                     |                             |                    | 35                     |                    |
| 63    | UXBRIDGE            | 63                 | Gneiss             | Gneiss        | 30                     | 20                          | 10                 | 35                     |                    |
| 64    | WALTHAM             | 4                  | Hornblende Granite | Granite       | 50                     | 35                          | 10                 |                        |                    |
| 65    | WARE                | 64                 | Diabase            | Trap          |                        | 35                          |                    |                        | 60                 |
| 66    | WATERTOWN           | 96                 | Diorite            | Trap          | 55                     | 2                           | 15                 |                        |                    |
| 67    | W. SPRINGFIELD      | 12                 | Augite Diabase     | Trap          |                        | 45                          |                    |                        | 50                 |
| 68    | W. SPRINGFIELD      | 67                 | Diabase            | Trap          |                        | 40                          |                    |                        | 50                 |
| 69    | W. SPRINGFIELD      | 91                 | Augite Diabase     | Trap          |                        | 50                          |                    |                        | 30                 |
| 70    | W. SPRINGFIELD      | 93                 | Augite Diabase     | Trap          |                        | 50                          |                    |                        | 30                 |
| 71    | WESTPORT            | 81                 | Gneiss             | Gneiss        | 45                     |                             | 40                 |                        |                    |
| 72    | WEYMOUTH            | 92                 | Felsite            | Porphyry      | 90                     |                             |                    |                        |                    |
| 73    | WINCHESTER          | 56                 | Hornblende Diorite | Trap          |                        | 40                          | 2                  | 45                     |                    |
| 74    | WINCHESTER          | 57                 | Hornblende Granite | Granite       | 60                     |                             | 20                 | 10                     |                    |
| 75    | WINCHESTER          | 58                 | Granite            | Granite       | 30                     | 40                          | 7                  |                        |                    |
| 76    | WINCHESTER          | 59                 | Quartz Diabase     | Trap          |                        | 30                          |                    |                        | 50                 |



## II

[illegible]



## APPENDIX E.

TABLE SHOWING TOWNS AND CITIES IN WHICH WORK HAS BEEN DONE DURING THE YEAR 1898,  
THE RESIDENT ENGINEERS ON SUCH WORK, TOGETHER WITH DATES OF BEGINNING AND  
ENDING.

| TOWN OR CITY.         | County.               | Lay-out.          | Resident Engineer.           | Date of Contract. | Date of Beginning. | Date of Ending. |
|-----------------------|-----------------------|-------------------|------------------------------|-------------------|--------------------|-----------------|
| Adams, . . . . .      | Berkshire, . . . . .  | 1897              | Joyner, F. H., . . . . .     | Sept. 2, 1897,    | May 4, 1898,       | June 11, 1898.  |
| Andover, . . . . .    | Essex, . . . . .      | 1897              | Gerry, L. L., . . . . .      | June 18, 1897,    | Jan. 1, 1898,      | Jan. 24, 1898.  |
| Andover, . . . . .    | Essex, . . . . .      | 1897              | Gerry, L. L., . . . . .      | June 18, 1897,    | Mar. 28, 1898,     | Apr. 13, 1898.  |
| Ashby, . . . . .      | Middlesex, . . . . .  | 1898              | Brown, C. L., . . . . .      | Aug. 11, 1898,    | Aug. 16, 1898,     | Nov. 28, 1898.  |
| Ashfield, . . . . .   | Franklin, . . . . .   | 1897              | Packard, S. G., . . . . .    | Oct. 7, 1897,     | Jan. 1, 1898,      | Sept. 7, 1898.  |
| Ashfield, . . . . .   | Franklin, . . . . .   | 1898 <sup>1</sup> | Packard, S. G., . . . . .    | May 26, 1898,     | June 9, 1898,      | Dec. 7, 1898.   |
| Ashfield, . . . . .   | Franklin, . . . . .   | 1898 <sup>1</sup> | McClintock, E. P., . . . . . | May 26, 1898,     | June 20, 1898,     | Oct. 5, 1898.   |
| Ashfield, . . . . .   | Franklin, . . . . .   | 1898 <sup>2</sup> | Packard, S. G., . . . . .    | Aug. 11, 1898,    | Sept. 1, 1898,     | Dec. 31, 1898.  |
| Auburn, . . . . .     | Worcester, . . . . .  | 1898              | Gray, A. W., . . . . .       | Sept. 22, 1898,   | Oct. 10, 1898,     | Nov. 26, 1898.  |
| Barnstable, . . . . . | Barnstable, . . . . . | 1897              | Everett, P. H., . . . . .    | Aug. 26, 1897,    | Jan. 1, 1898,      | Mar. 8, 1898.   |
| Barnstable, . . . . . | Barnstable, . . . . . | 1897              | Parsons, S. A., . . . . .    | Aug. 26, 1897,    | Mar. 18, 1898,     | Apr. 26, 1898.  |
| Bedford, . . . . .    | Middlesex, . . . . .  | 1897              | Cutter, F. P., . . . . .     | Aug. 19, 1897,    | Apr. 2, 1898,      | Apr. 16, 1898.  |
| Beverly, . . . . .    | Essex, . . . . .      | 1897              | Brown, C. L., . . . . .      | Oct. 14, 1897,    | Apr. 5, 1898,      | Apr. 29, 1898.  |
| Beverly, . . . . .    | Essex, . . . . .      | 1898              | Keene, T. M., . . . . .      | Aug. 25, 1898,    | Sept. 14, 1898,    | Oct. 29, 1898.  |
| Bourne, . . . . .     | Barnstable, . . . . . | 1898              | Joyce, W. A., . . . . .      | Sept. 8, 1898,    | Oct. 13, 1898,     | Dec. 21, 1898.  |
| Bourne, . . . . .     | Barnstable, . . . . . | 1898              | Ruggles, E. F., . . . . .    | Sept. 8, 1898,    | Dec. 22, 1898,     | Dec. 31, 1898.  |
| Boxborough, . . . . . | Middlesex, . . . . .  | 1897              | Grover, O. L., . . . . .     | Aug. 12, 1897,    | May 17, 1898,      | June 8, 1898.   |
| Brockton, . . . . .   | Plymouth, . . . . .   | 1897              | Wason, H. B., . . . . .      | July 29, 1897,    | Oct. 10, 1898,     | Dec. 17, 1898.  |
| Brockton, . . . . .   | Plymouth, . . . . .   | 1898              | Wason, H. B., . . . . .      | Aug. 25, 1898,    | Oct. 10, 1898,     | Dec. 17, 1898.  |

|                     |   |   |   |   |        |                    |                 |                 |                 |
|---------------------|---|---|---|---|--------|--------------------|-----------------|-----------------|-----------------|
| Brookfield, .       | . | . | . | . | 1897   | Hammersley, W. P., | Sept 16, 1897,  | Apr. 18, 1898,  | June 4, 1898.   |
| Brookfield, .       | . | . | . | . | 1898   | Gray, A. W., .     | Aug. 18, 1898,  | Sept. 23, 1898, | Sept. 27, 1898. |
| Brookfield, .       | . | . | . | . | 1898   | Coyne, J. E., .    | Aug. 18, 1898,  | Sept. 29, 1898, | Nov. 29, 1898.  |
| Brookfield, .       | . | . | . | . | 1898   | Grover, O. L., .   | Aug. 18, 1898,  | Nov. 30, 1898,  | Dec. 9, 1898.   |
| Brimfield, .        | . | . | . | . | 1897   | Maynard, G. F.,    | Sept. 23, 1897, | May 18, 1898,   | Aug. 13, 1898.  |
| Brimfield, .        | . | . | . | . | 1897   | Maynard, G. F.,    | Sept. 23, 1897, | Aug. 29, 1898,  | Sept. 17, 1898. |
| Buckland, .         | . | . | . | . | 1898   | Parsons, S. A., .  | Aug. 18, 1898,  | Aug. 30, 1898,  | Dec. 31, 1898.  |
| Charlemont, .       | . | . | . | . | 1897   | Ruggles, E. F.,    | Sept. 12, 1897, | Apr. 10, 1898,  | Apr. 12, 1898.  |
| Charlemont, .       | . | . | . | . | 1898   | Winslow, D. H.,    | July 7, 1898,   | July 25, 1898,  | Oct. 1, 1898.   |
| Chicopee, .         | . | . | . | . | 1898   | Gerry, L. L., .    | Nov. 17, 1898,  | Nov. 22, 1898,  | Dec. 7, 1898.   |
| Cohasset, .         | . | . | . | . | 1897   | Litchfield, S., .  | Sept. 16, 1897, | Mar. 29, 1898,  | Apr. 19, 1898.  |
| Colrain, .          | . | . | . | . | 1898   | Proctor, L. J., .  | Sept. 1, 1898,  | Sept. 26, 1898, | Dec. 14, 1898.  |
| Concord, .          | . | . | . | . | 1897   | Cutter, F. P., .   | July 29, 1897,  | June 23, 1898,  | June 29, 1898.  |
| Concord, .          | . | . | . | . | 1898   | Davis, W. E., .    | Sept. 1, 1898,  | Sept. 20, 1898, | Oct. 6, 1898.   |
| Concord, .          | . | . | . | . | 1898   | Cutter, F. P., .   | Sept. 1, 1898,  | Oct. 6, 1898,   | Nov. 16, 1898.  |
| Dennis, .           | . | . | . | . | 1898   | Parsons, S. A.,    | Mar. 3, 1898,   | Mar. 10, 1898,  | Aug. 19, 1898.  |
| Erving, .           | . | . | . | . | 1898   | Pillsbury, J. H.,  | Oct. 27, 1898,  | Nov. 9, 1898,   | Dec. 7, 1898.   |
| Fitchburg, .        | . | . | . | . | 1897   | Winslow, D. H.,    | Sept. 10, 1897, | Mar. 25, 1898,  | July 16, 1898.  |
| Gardner, .          | . | . | . | . | 1898   | Crosby, W. W.,     | May 12, 1898,   | June 2, 1898,   | Oct. 22, 1898.  |
| Gloucester, .       | . | . | . | . | 1898   | Dadley, A. D.,     | Mar. 17, 1898,  | Mar. 24, 1898,  | Aug. 6, 1898.   |
| Gloucester, .       | . | . | . | . | 1898   | Dadley, A. D.,     | Mar. 17, 1898,  | Sept. 22, 1898, | Dec. 24, 1898.  |
| Great Barrington, . | . | . | . | . | 1897   | Power, E. P., .    | Sept. 10, 1897, | Jan. 1, 1898,   | Apr. 16, 1898.  |
| Great Barrington, . | . | . | . | . | 1897   | Joyner, F. H.,     | Sept. 10, 1897, | Apr. 18, 1898,  | May 4, 1898.    |
| Great Barrington, . | . | . | . | . | 1897   | Power, E. P., .    | Sept. 10, 1897, | May 5, 1898,    | July 25, 1898.  |
| Great Barrington, . | . | . | . | . | 1897   | Southworth, A. L., | Sept. 10, 1897, | July 29, 1898,  | Nov. 14, 1898.  |
| Hadley, .           | . | . | . | . | 1898   | Gerry, L. L., .    | Sept. 29, 1898, | Oct. 18, 1898,  | Nov. 17, 1898.  |
| Hancock, .          | . | . | . | . | 1898   | Joyner, F. H.,     | June 9, 1898,   | June 20, 1898,  | July 6, 1898.   |
| Hancock, .          | . | . | . | . | 1898   | McLeod, T. M.,     | June 9, 1898,   | July 6, 1898,   | Sept. 12, 1898. |
| Hardwick, .         | . | . | . | . | 1897   | Ruggles, E. F.,    | Sept. 30, 1897, | May 2, 1898,    | Aug. 9, 1898.   |
| Hardwick, .         | . | . | . | . | 1897   | Shepardson, E. W., | Sept. 30, 1897, | May 12, 1898,   | July 14, 1898.  |
| Holbrook, .         | . | . | . | . | 1894-6 | Litchfield, S., .  | Apr. 7, 1898,   | Apr. 20, 1898,  | July 18, 1898.  |

2 Second.

1 First.

TABLE SHOWING TOWNS AND CITIES IN WHICH WORK HAS BEEN DONE, ETC. — *Continued.*

| TOWN OR CITY.                 | County.              | Lay-out. | Resident Engineer.           | Date of Contract. | Date of Beginning. | Date of Ending. |
|-------------------------------|----------------------|----------|------------------------------|-------------------|--------------------|-----------------|
| Holden, . . . . .             | Worcester, . . . . . | 1898     | Grimes, M. W., . . . . .     | July 28, 1898,    | Aug. 6, 1898,      | Oct. 18, 1898.  |
| Leicester, . . . . .          | Worcester, . . . . . | 1898     | Starbird, H. R., . . . . .   | May 12, 1898,     | June 22, 1898,     | June 30, 1898.  |
| Leicester, . . . . .          | Worcester, . . . . . | 1898     | Grover, O. L., . . . . .     | May 12, 1898,     | July 1, 1898,      | Sept. 27, 1898. |
| Leicester, . . . . .          | Worcester, . . . . . | 1898     | Gray, A. W., . . . . .       | May 12, 1898,     | Sept. 28, 1898,    | Oct. 7, 1898.   |
| Leicester, . . . . .          | Worcester, . . . . . | 1898     | Grover, O. L., . . . . .     | May 12, 1898,     | Oct. 8, 1898,      | Nov. 29, 1898.  |
| Lexington, . . . . .          | Middlesex, . . . . . | 1898     | Cutter, F. P., . . . . .     | Mar. 31, 1898,    | Apr. 17, 1898,     | Sept. 30, 1898. |
| Lowell, . . . . .             | Middlesex, . . . . . | 1897     | Everett, P. H., . . . . .    | July 29, 1897,    | Mar. 30, 1898,     | Apr. 30, 1898.  |
| Lowell, . . . . .             | Middlesex, . . . . . | 1898     | Everett, P. H., . . . . .    | April 28, 1898,   | May 9, 1898,       | Sept. 20, 1898. |
| Lunenburg, . . . . .          | Worcester, . . . . . | 1898     | Litchfield, S., . . . . .    | Aug. 18, 1898,    | Sept. 10, 1898,    | Dec. 1, 1898.   |
| Marlborough (East), . . . . . | Middlesex, . . . . . | 1897     | Welton, C. A., . . . . .     | Sept. 10, 1897,   | Apr. 25, 1898,     | July 30, 1898.  |
| Marlborough (West), . . . . . | Middlesex, . . . . . | 1897     | Wason, H. B., . . . . .      | Oct. 14, 1897,    | Apr. 11, 1898,     | Sept. 24, 1898. |
| Marshfield, . . . . .         | Plymouth, . . . . .  | 1898     | Norton, C. H., . . . . .     | Sept. 1, 1898,    | Sept. 27, 1898,    | Dec. 8, 1898.   |
| Merrimac, . . . . .           | Essex, . . . . .     | 1897     | Dadley, A. D., . . . . .     | Sept. 2, 1897,    | Jan. 1, 1898,      | Jan. 22, 1898.  |
| Merrimac, . . . . .           | Essex, . . . . .     | 1897     | Shaw, S., . . . . .          | Sept. 2, 1897,    | Apr. 1, 1898,      | Apr. 5, 1898.   |
| Merrimac, . . . . .           | Essex, . . . . .     | 1897     | McLeod, T. M., . . . . .     | Sept. 2, 1897,    | Apr. 7, 1898,      | Apr. 23, 1898.  |
| Merrimac, . . . . .           | Essex, . . . . .     | 1897     | Grover, O. L., . . . . .     | Sept. 2, 1897,    | May 3, 1898,       | May 13, 1898.   |
| Merrimac, . . . . .           | Essex, . . . . .     | 1898     | Jackson, C. J., . . . . .    | Oct. 13, 1898,    | Nov. 18, 1898,     | Nov. 29, 1898.  |
| Middleborough, . . . . .      | Plymouth, . . . . .  | 1897     | Jackson, C. J., . . . . .    | July 29, 1897,    | Sept. 8, 1898,     | Nov. 15, 1898.  |
| Middleborough, . . . . .      | Plymouth, . . . . .  | 1898     | Jackson, C. J., . . . . .    | Sept. 1, 1898,    | Sept. 8, 1898,     | Nov. 15, 1898.  |
| Montague, . . . . .           | Franklin, . . . . .  | 1898     | Gerry, L. L., . . . . .      | June 25, 1898,    | July 16, 1898,     | Sept. 17, 1898. |
| Montague, . . . . .           | Franklin, . . . . .  | 1898     | Gerry, L. L., . . . . .      | June 25, 1898,    | Sept. 27, 1898,    | Oct. 14, 1898.  |
| Nantucket, . . . . .          | Nantucket, . . . . . | 1897     | Joyner, F. H., . . . . .     | Oct. 28, 1897,    | Jan. 1, 1898,      | Apr. 16, 1898.  |
| New Braintree, . . . . .      | Worcester, . . . . . | 1897     | Ruggles, E. F., . . . . .    | Sept. 30, 1898,   | May 2, 1898,       | Aug. 9, 1898.   |
| New Braintree, . . . . .      | Worcester, . . . . . | 1897     | Shepardson, E. W., . . . . . | Sept. 30, 1898,   | May 12, 1898,      | July 14, 1898.  |
| Newburyport, . . . . .        | Essex, . . . . .     | 1898     | Palmer, J. E., . . . . .     | Oct. 6, 1898,     | Oct. 24, 1898,     | Dec. 7, 1898.   |
| Norfolk, . . . . .            | Norfolk, . . . . .   | 1895     | Shaw, S., . . . . .          | Sept. 30, 1897,   | Apr. 13, 1898,     | May 4, 1898.    |
| Northampton, . . . . .        | Hampshire, . . . . . | 1898     | Crosby, W. W., . . . . .     | Sept. 29, 1898,   | Oct. 25, 1898,     | Dec. 7, 1898.   |

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| North Attleborough, . | . | . | . | Shaw, S., .          | Sept. 2, 1897,  | May 15, 1898,   | June 13, 1898.  |
| North Attleborough, . | . | . | . | Everett, P. H., .    | Sept. 2, 1897,  | June 21, 1898,  | June 30, 1898.  |
| Northborough, .       | . | . | . | Wason, H. B., .      | Sept. 16, 1897, | April 4, 1898,  | Sept. 24, 1898. |
| Northborough, .       | . | . | . | Wilton, C. A., .     | Sept. 22, 1898, | Nov. 9, 1898,   | Dec. 10, 1898.  |
| Norwood, .            | . | . | . | Shaw, S., .          | Sept. 2, 1897,  | April 12, 1898, | Apr. 18, 1898.  |
| North Reading, .      | . | . | . | Gerry, L. L., .      | June 18, 1897,  | Jan. 1, 1898,   | Jan. 31, 1898.  |
| North Reading, .      | . | . | . | Gerry, L. L., .      | June 18, 1897,  | Mar. 29, 1898,  | Apr. 13, 1898.  |
| Paxton, .             | . | . | . | Holden, H. C., .     | July 28, 1898,  | Aug. 9, 1898,   | Oct. 6, 1898.   |
| Phillipston, .        | . | . | . | Brown, C. L., .      | Sept. 30, 1897, | May 19, 1898,   | July 23, 1898.  |
| Phillipston, .        | . | . | . | Stuart, F. M., .     | Sept. 15, 1898, | Sept. 28, 1898, | Dec. 6, 1898.   |
| Pittsfield, .         | . | . | . | Joyner, F. H., .     | Sept. 2, 1897,  | May 23, 1898,   | June 11, 1898.  |
| Pittsfield, .         | . | . | . | McLeod, T. M., .     | Sept. 8, 1898,  | Sept. 21, 1898, | Oct. 24, 1898.  |
| Pittsfield, .         | . | . | . | Hammersley, W. P., . | Sept. 8, 1898,  | Oct. 24, 1898,  | Dec. 2, 1898.   |
| Plymouth, .           | . | . | . | Nickerson, E., .     | Aug. 4, 1898,   | Sept. 19, 1898, | Dec. 31, 1898.  |
| Plymouth, .           | . | . | . | Warren, H. E., .     | Nov. 4, 1897,   | Jan. 1, 1898,   | Jan. 31, 1898.  |
| Plymouth, .           | . | . | . | Warren, H. E., .     | Nov. 4, 1897,   | Feb. 23, 1898,  | Apr. 1, 1898.   |
| Revere (1), .         | . | . | . | Hall, H. A., .       | Nov. 26, 1897,  | Jan. 1, 1898,   | Feb. 12, 1898.  |
| Revere (1), .         | . | . | . | Hall, H. A., .       | Nov. 26, 1897,  | Mar. 24, 1898,  | Sept. 30, 1898. |
| Revere (2), .         | . | . | . | Hall, H. A., .       | April 7, 1898,  | May 17, 1898,   | Aug. 16, 1898.  |
| Revere (2), .         | . | . | . | Dadley, A. D., .     | April 7, 1898,  | Aug. 20, 1898,  | Sept. 7, 1898.  |
| Revere (2), .         | . | . | . | Nichols, E. J., .    | April 7, 1898,  | Sept. 22, 1898, | Dec. 31, 1898.  |
| Richmond, .           | . | . | . | Power, E. P., .      | Aug. 19, 1897,  | April 18, 1898, | May 4, 1898.    |
| Richmond, .           | . | . | . | Joyner, F. H., .     | Aug. 19, 1897,  | June 14, 1898,  | July 23, 1898.  |
| Richmond, .           | . | . | . | Farnham, A. B., .    | Sept. 29, 1898, | Oct. 7, 1898,   | Dec. 12, 1898.  |
| Russell, .            | . | . | . | Hammersley, W. P., . | Aug. 12, 1897,  | June 6, 1898,   | Sept. 20, 1898. |
| Russell (R.), .       | . | . | . | Hammersley, W. P., . | May 12, 1898,   | June 24, 1898,  | Oct. 22, 1898.  |
| Russell (R.), .       | . | . | . | Shepardson, E. W., . | May 12, 1898,   | Oct. 13, 1898,  | Nov. 17, 1898.  |
| Russell (R.), .       | . | . | . | Southworth, A. L., . | May 12, 1898,   | Nov. 15, 1898,  | Nov. 26, 1898.  |
| Russell (H.), .       | . | . | . | Hammersley, W. P., . | Sept. 29, 1898, | Oct. 17, 1898,  | Oct. 22, 1898.  |
| Russell (H.), .       | . | . | . | Shepardson, E. W., . | Sept. 29, 1898, | Oct. 13, 1898,  | Oct. 17, 1898.  |
| Russell (H.), .       | . | . | . | Southworth, A. L., . | Sept. 29, 1898, | Nov. 15, 1898,  | Dec. 9, 1898.   |
| Sandwich, .           | . | . | . | Phillips, H. D., .   | Sept. 22, 1898, | Oct. 20, 1898,  | Dec. 5, 1898.   |



TABLE SHOWING TOWNS AND CITIES IN WHICH WORK HAS BEEN DONE, ETC. — *Concluded.*

| TOWN OR CITY.   | County. | Lay-out. | Resident Engineer. | Date of Contract. | Date of Beginning. | Date of Ending. |
|-----------------|---------|----------|--------------------|-------------------|--------------------|-----------------|
| Sandwich, .     | . . .   | . . .    | Winslow, D. H.,    | Sept. 22, 1898,   | Dec. 5, 1898,      | Dec. 22, 1898.  |
| Sandwich, .     | . . .   | . . .    | Crosby, W. W.,     | Sept. 22, 1898,   | Dec. 20, 1898,     | Dec. 31, 1898.  |
| Shrewsbury, .   | . . .   | . . .    | Welton, C. A.,     | Aug. 18, 1898,    | Sept. 1, 1898,     | Nov. 12, 1898.  |
| South Hadley, . | . . .   | . . .    | Grimes, M. W.,     | Oct. 10, 1898,    | Oct. 24, 1898,     | Dec. 10, 1898.  |
| Sterling, .     | . . .   | . . .    | Merrill, G. A.,    | Aug. 19, 1897,    | Sept. 15, 1898,    | Oct. 10, 1898.  |
| Sterling, .     | . . .   | . . .    | Merrill, G. A.,    | Sept. 1, 1898,    | Sept. 16, 1898,    | Nov. 26, 1898.  |
| Stoneham, .     | . . .   | . . .    | Wood, G. W.,       | Oct. 21, 1897,    | Jan. 1, 1898,      | Jan. 17, 1898.  |
| Stoneham, .     | . . .   | . . .    | Wood, G. W.,       | Oct. 21, 1897,    | Mar. 15, 1898,     | Apr. 23, 1898.  |
| Sturbridge, .   | . . .   | . . .    | McLeod, T. M.,     | Oct. 7, 1897,     | Apr. 26, 1898,     | July 1, 1898.   |
| Sudbury, .      | . . .   | . . .    | Welton, C. A.,     | Sept. 10, 1897,   | May 4, 1898,       | Aug. 10, 1898.  |
| Sudbury, .      | . . .   | . . .    | Keene, T. M.,      | Oct. 20, 1898,    | Nov. 3, 1898,      | Dec. 9, 1898.   |
| Sunderland, .   | . . .   | . . .    | Ruggles, E. F.,    | Aug. 19, 1897,    | Apr. 14, 1898,     | Apr. 27, 1898.  |
| Swampscott, .   | . . .   | . . .    | Nickerson, E.,     | Feb. 10, 1898,    | Mar. 2, 1898,      | Aug. 31, 1898.  |
| Swampscott, .   | . . .   | . . .    | Dadley, A. D.,     | Feb. 10, 1898,    | Sept. 8, 1898,     | Sept. 21, 1898. |
| Swampscott, .   | . . .   | . . .    | Wilber, N. B.,     | Feb. 10, 1898,    | Sept. 22, 1898,    | Sept. 30, 1898. |
| Taunton, .      | . . .   | . . .    | Warren, H. E.,     | Aug. 18, 1898,    | Sept. 1, 1898,     | Nov. 19, 1898.  |
| Taunton, .      | . . .   | . . .    | Cutler, F. P.,     | Sept. 15, 1898,   | Nov. 22, 1898,     | Dec. 17, 1898.  |
| Townsend, .     | . . .   | . . .    | Brine, L. R.,      | Aug. 18, 1898,    | Oct. 21, 1898,     | Dec. 31, 1898.  |
| Truro, .        | . . .   | . . .    | Holden, H. C.,     | Sept. 2, 1897,    | Oct. 3, 1898,      | Oct. 20, 1898.  |
| Uxbridge, .     | . . .   | . . .    | Holden, H. C.,     | Sept. 15, 1898,   | Oct. 7, 1898,      | Dec. 1, 1898.   |
| Walpole, .      | . . .   | . . .    | McClintock, E. P., | Sept. 29, 1898,   | Oct. 8, 1898,      | Dec. 31, 1898.  |
| Ware, .         | . . .   | . . .    | Ruggles, E. F.,    | Sept. 30, 1897,   | May 12, 1898,      | Aug. 9, 1898.   |
| Ware, .         | . . .   | . . .    | Shepardson, E. W., | Sept. 30, 1897,   | May 12, 1898,      | July 14, 1898.  |
| Warren, .       | . . .   | . . .    | Grimes, M. W.,     | Mar. 10, 1898,    | Mar. 26, 1898,     | July 15, 1898.  |
| Wayland, .      | . . .   | . . .    | Power, E. P.,      | Aug. 11, 1898,    | Aug. 31, 1898,     | Nov. 30, 1898.  |
| Wenham, .       | . . .   | . . .    | Gerry, L. L.,      | Aug. 19, 1897,    | Apr. 19, 1898,     | July 1, 1898.   |
| Wenham, .       | . . .   | . . .    | Brown, C. L.,      | Aug. 19, 1897,    | May 4, 1898,       | May 18, 1898.   |



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|--------------------------|------|------------------------------|-----------------|-----------------|-----------------|
| Westborough, . . . . .   | 1897 | Holden, H. C., . . . . .     | Oct. 7, 1897,   | Mar. 22, 1898,  | May 5, 1898.    |
| West Boylston, . . . . . | 1897 | Murray, J. D., . . . . .     | Oct. 21, 1897,  | Mar. 22, 1898,  | June 9, 1898.   |
| West Boylston, . . . . . | 1897 | Holden, H. C., . . . . .     | Oct. 21, 1897,  | June 14, 1898,  | July 20, 1898.  |
| West Boylston, . . . . . | 1898 | Maynard, G. F., . . . . .    | Sept. 15, 1898, | Sept. 28, 1898, | Nov. 30, 1898.  |
| Westfield (1), . . . . . | 1898 | Wood, G. W., . . . . .       | May 12, 1898,   | June 3, 1898,   | June 13, 1898.  |
| Westfield (1), . . . . . | 1898 | Grover, O. L., . . . . .     | May 12, 1898,   | June 14, 1898,  | June 27, 1898.  |
| Westfield (2), . . . . . | 1898 | Davis, W. E., . . . . .      | Oct. 27, 1898,  | Nov. 1, 1898,   | Nov. 29, 1898.  |
| Westminster, . . . . .   | 1897 | Winslow, D. H., . . . . .    | June 18, 1897,  | Nov. 4, 1898,   | Nov. 18, 1898.  |
| Westminster, . . . . .   | 1898 | Winslow, D. H., . . . . .    | Sept. 24, 1897, | Oct. 4, 1898,   | Nov. 22, 1898.  |
| West Newbury, . . . . .  | 1897 | Grover, O. L., . . . . .     | June 24, 1897,  | May 5, 1898,    | May 13, 1898.   |
| Westport, . . . . .      | 1898 | Warren, H. E., . . . . .     | Apr. 7, 1898,   | May 10, 1898,   | Aug. 17, 1898.  |
| Weymouth, . . . . .      | 1896 | Norton, C. H., . . . . .     | Aug. 13, 1896,  | Apr. 23, 1898,  | June 6, 1898.   |
| Weymouth, . . . . .      | 1897 | Norton, C. H., . . . . .     | July 8, 1897,   | Apr. 28, 1898,  | June 20, 1898.  |
| Weymouth, . . . . .      | 1898 | Wood, G. W., . . . . .       | Apr. 14, 1898,  | June 20, 1898,  | Aug. 19, 1898.  |
| Williamsburg, . . . . .  | 1898 | Shepardson, E. W., . . . . . | Apr. 14, 1898,  | Aug. 18, 1898,  | Oct. 13, 1898.  |
| Williamsburg, . . . . .  | 1898 | Ruggles, E. F., . . . . .    | Apr. 14, 1898,  | Aug. 20, 1898,  | Dec. 16, 1898.  |
| Williamsburg, . . . . .  | 1898 | Wood, G. W., . . . . .       | Aug. 19, 1898,  | Sept. 2, 1898,  | Nov. 19, 1898.  |
| Williamstown, . . . . .  | 1897 | Ruggles, E. F., . . . . .    | Sept. 2, 1897,  | Jan. 1, 1898,   | Feb. 19, 1898.  |
| Windsor, . . . . .       | 1897 | Farnham, A. B., . . . . .    | Sept. 2, 1897,  | June 1, 1898,   | Oct. 6, 1898.   |
| Windsor, . . . . .       | 1897 | Holden, H. C., . . . . .     | Nov. 18, 1897,  | May 11, 1898,   | June 13, 1898.  |
| Worcester, . . . . .     | 1897 | Shaw, S., . . . . .          | Nov. 18, 1897,  | June 14, 1898,  | Aug. 4, 1898.   |
| Worcester, . . . . .     | 1897 | Grimes, M. W., . . . . .     | Nov. 18, 1897,  | Aug. 5, 1898,   | Sept. 19, 1898. |
| Wrentham, . . . . .      | 1897 | Shaw, S., . . . . .          | June 18, 1897,  | Apr. 25, 1898,  | May 10, 1898.   |
| Wrentham, . . . . .      | 1898 | Shaw, S., . . . . .          | Aug. 11, 1898,  | Aug. 22, 1898,  | Dec. 20, 1898.  |

## APPENDIX F.

## THE DISTRIBUTION OF STATE ROADS IN THE COMMONWEALTH.

For the information of the many interested in this question, the following is reprinted from the reports of 1897 and 1898:—

The selection of roadways which shall be rebuilt as State roads at the expense of the Commonwealth is naturally the most difficult problem with which the commission has to deal. The nature of that problem will be more readily understood after an examination of the map of the State, which forms a part of this report, on which is laid down, in addition to county and town boundaries, the roadways which the commission has been petitioned to take, and those which it has up to this date actually accepted as State roads, nearly all of the latter having been actually constructed.

Under the provisions of the law the commissioners are not permitted to control the expenditure of the appropriation entirely by their own judgment. They are restricted to two provisions, the wisdom of which they do not at all criticise, but which should always be kept in mind in considering the results of their labors. The first of these is that "all constructions of State roads shall be fairly apportioned among the different counties," and in this they have been guided in the main by the relative miles of roadway existing in the several counties. The second is the restriction growing out of the use of the petition. It was obviously the intention of the Legislature to limit the initiative of the Highway Commission in planning for the location of State ways. As is well known, the commission cannot of its own motion accept or reject any route; it has to await the petitions of the municipalities or the county commissioners. The only manner in which it can effect any satisfactory grouping of these petitions, so that continuous routes may come from the constructive work, is by rejecting the petitions which may come to it, or by counselling with the authorities having the right to petition in advance of their formal requests.

In order to keep the State roads from having a total lack of ultimate purpose in their relations to each other in the distribution of the Commonwealth, the commission has been compelled gradually, though not formally, to come to a state of mind as regards the selection of roads which are to be taken. In part this rather undetermined project is indicated by the distribution of the routes which have been accepted, as is shown on the accompanying map.\* In part, though less distinctly, it is indicated by the direction of the petitions, the greater part of which have been submitted after more or less conference with the commission.

It appears to your commission that the time has now come when some statement, still necessarily tentative, shall be made which will set forth in a general way the views of the commission as to the policy to be followed by the Commonwealth in the construction of State roads. This statement is submitted in no sense as a hard-and-fast plan, but in order to set forth the direction in which the work of the commission is inevitably drifting; and we should hope that this statement may provoke criticism, and, if need be, modification of the action.

It seems, in the first place, clear that the most important of the many needs which are to be met by the construction of State roads is that which relates to the connection of centres of business in the Commonwealth with each other, in so far as the business relations demand this connection. Thus, where two towns have a large exchange of relations, the way lying through other towns which profit little by the traffic, there is good reason why the State should take charge of the main connecting way.

Closely related to this is the case of a considerable number of smaller, less populous towns, surrounding a large city or centre of dense population, with which they have intimate business relations. It furnishes the market for their products, and the profit to the producer as well as the cost to the consumers is largely determined by the cost of local transportation. Even where facilities for transportation by rail exist, there is still much use of the public highway whenever it is in reasonably good condition. It is in evidence before the commission that many articles of produce, especially perishable and delicate fruits, are preferably sent many miles to the city markets in farm wagons, where shipping by rail would be both quicker and cheaper, on account of the better condition in which they may be delivered.

In making its selections among numerous petitions, the commission has endeavored to keep in mind the great advantages arising from easy connections between large centres of population and the sur-

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\* See end of report.

rounding agricultural areas; for in so doing the demands of both urban and suburban populations are recognized, and their mutual interests promoted.

Another class of cases arises, in which one or more towns lie remote from the rail or water ways, losing opportunities of advancement on account of this hindrance. These conditions are in some cases so grave that the average cost during the year of transporting a ton of freight from a village otherwise well placed for manufacturing to the business centres of the Commonwealth is greater than would be incurred in transporting the same burden from the central portion of the Mississippi valley to the city of Boston. In these cases, also, the commission feels impelled to better the traffic conditions by improving the way.

In yet other but not numerous cases, portions of the State adjacent to this Commonwealth have their natural business centres in some of our cities or towns, but the people thus residing beyond the bounds of the Commonwealth are deterred from seeking access to its markets by the difficulties of the way. In such instances it seems desirable that good roads should be provided to the bounds of the Commonwealth.

The conditions above mentioned may be regarded as of a local character. There remains yet another of such interests of a general nature to be provided for. These will be met by so grouping the State roads that they will in the end afford continuous routes through the Commonwealth, which may serve the interests of pleasure travel or the occasional distant carriage which would be done by ordinary wagons where the roads were good. These extended ways, including in general those which relate to driving for a distance of more than fifteen miles, are of greater importance to the interests of the Commonwealth than might at first sight appear. A considerable part of the present and much of the prospective value of real estate in the Commonwealth, as well as the traffic which takes place therein, is due to the incoming of people from the central and western parts of the country, who seek summer residences and family homes in the very attractive rural districts of the State. People who thus resort to the Commonwealth for recreation desire opportunities for driving such as would be afforded by a well-regulated system of State ways, which would be laid out and beautified with some reference to the natural and historic interests of the country. It is hardly necessary to say that the use of the bicycle for pleasure travel would also be thus accommodated.

Although the commissioners do not propose to build roads which relate only or even mainly to pleasure travel, they feel that the service which can be done by a system which relates to such travel is so



great and of such economic importance to the Commonwealth that it should always be kept in mind.

An examination of the map referred to above will reveal in some degree the groupings of highways up to this time, as indicated by petitions and by acceptance. A few rather long, continuous lines of State highway are apparently demanded at the present time, and their construction ought to be kept in view in the acceptance of petitions; but the commission must not allow itself to be too much influenced by an adjustment of petitions, which often stand only for local interest and activity. While there is often good reason for accepting one highway on account of local conditions, although it may not form a part of any general scheme, and another because it does fit into such a scheme, although of less local value than another which may be near by, there is often equally good reason for postponing action on a third because it is relatively of less *immediate* importance than either of the others.

The commissioners are of the opinion that nearly every mile of road thus far petitioned for should some time be built as a State highway; but it is clear that, as only a comparatively small number of miles can be completed annually, some selection must be made.

In choosing which shall be undertaken first, the commissioners must be governed by considerations of the broadest character, many of which will not be evident to those who necessarily think most of local interests. The order of presentation of petitions can have no influence, nor should it be inferred that, because a petition is not granted this year, it may not be next, or the year after. Outside of the limitations put upon them by the statute, the commissioners are bound to exercise their best judgment in all cases; and, while they are likely to be far from infallible, and welcome fair criticism, all who are unselfishly interested in the extension of this important system of State highway construction are likely to accept the judgment as the result of a comprehensive knowledge of the whole situation, growing out of the necessary consideration of the scheme as a whole.



LETTER TO THE GOVERNOR AND COUNCIL CONCERNING  
THE WORCESTER COUNTY ALLOTMENTS.

Boston, June 1, 1897.

To His Excellency ROGER WOLCOTT, *Governor of Massachusetts.*

SIR:—The Massachusetts Highway Commission begs to acknowledge the receipt of a letter from the Executive clerk, dated Thursday, May 27, informing the commission that its request for permission to construct more than ten miles of State road in Worcester County during the current year, made in accordance with the provisions of section 4, chapter 497, Acts of 1894, was not granted.

The effect of this decision is so far-reaching, necessitating, as it does, a radical departure from the principles upon which the construction of State roads has been from the beginning of the work fairly apportioned among the several counties of the State, which principles were determined upon by the commissioners after a careful study of all possible methods of distribution, that we are compelled to believe that in the oral explanation of our request before the finance committee of the council, we failed to make a clear presentation of the reasons for making it.

We desire, therefore, to ask the attention of Your Excellency and the council to a statement of these reasons, and we respectfully request a reconsideration of the decision which has been communicated to us.

That part of the statute referring to the question of the distribution of State highways is as follows:—

“All construction of State roads shall be fairly apportioned by said commission among the different counties, and not more than ten miles of State road shall be constructed in any one county in any one year on petition as aforesaid without the previous approval thereof, in writing, by the governor and council.” (Section 4, chapter 497, Acts of 1894.)

It will be noted that the meaning of the phrase “fairly apportioned” is nowhere defined in the statute, and that it therefore devolves upon the Highway Commission to determine what shall constitute a fair apportionment. A single limitation, however, is placed upon the commission, in the provision that more than ten miles of State road shall not be constructed in any one county in any one year without previous consent of the governor and council.

We will first consider the interpretation of the words "fairly apportioned," as accepted by the commission.

A distribution among the several counties of the fund appropriated by the Legislature might be made upon any one of a number of considerations, the principal of which are the following:—

Assessed valuation.

Population.

Miles of existing road per 1,000 of population.

Population per mile of existing road.

Area.

Miles of existing road.

All of these were considered by the commission at the beginning of its work, and in their report for the year 1893 will be found tables showing statistics relative to the above, by which their value as a coefficient of distribution may be readily determined.

If, for example, the principle of assessed valuation be applied, it will be found that Suffolk County, in which there are but 53 miles of highway aside from city streets, and only 533 miles in all (about 2.5 per cent. of the whole), would necessarily receive nearly 40 per cent. of the appropriation; and, had this been allowed from the start, every mile of her roads would now be built and accepted as State highways, while such counties as Franklin and Hampshire would have had at the end of three years, a trifle over 1 mile each, with about 1,000 feet in Dukes and Nantucket. Surely such a distribution could hardly have been approved by any considerable number of people.

If population be accepted as a basis of apportionment, it will at once be seen that it is not much more nearly just than that of assessed valuation. Density of population and concentration of wealth will be found, in general, in the same areas, and neither has any logical or constant relation to the extent and cost of a system of public highways.

The number of existing miles of road per 1,000 of population has been suggested as a rational basis of distribution, on the principle that it may be an index of the extent to which highways are a necessity to the people. According to this rule, by far the larger share of the money appropriated would be expended in Dukes County, Franklin, Barnstable and Nantucket following closely. To Essex County would be allotted for the current year \$10,600, instead of \$46,500, as has been done under the system in use; and for Middlesex County there would be \$13,000, as against \$74,350.

Even more absurd would be the inverse of this proposition, which has also been suggested, viz., a division in proportion to the population per mile of existing roadway. Nantucket, with only 114 miles

of roadway in all, would have a larger amount than Barnstable, with about 1,000 miles, or Franklin, with nearly 1,500 miles; while to Suffolk County, with only 53 miles of road outside of city streets, would be allotted about sixteen times as much as to Worcester County, with nearly 3,800 miles of public roads.

A distribution in proportion to area alone, while unquestionably more nearly just than any of the methods already considered, would still be decidedly wrong in some cases, extent of territory being, as a matter of fact, not simply or directly related to the necessity for highways or the cost of their construction or maintenance.

There remains the basis of distribution which the commission adopted in the beginning, and under which its work has thus far proceeded, in a manner apparently satisfactory to all most deeply concerned in the matter. It consists in distributing the sum to be applied to road construction among the several counties in proportion to the number of miles of roadway already existing and maintained in these counties, not including city streets. Having shown that the application of any other of the several suggested and available principles would result in what we believe all would consider an unreasonable and unfair apportionment, it may be well to give one or two reasons why the commission believes that the rule under which it is working is fair and just, at least much more nearly so than any other has yet presented itself.

In the first place, it must not be forgotten that the appropriations which the commission expends are distinctly "State road" appropriations. The titles of the several acts under which the work is being done are instructive, as showing what the original intent of these acts was.

The first was to "establish a commission to improve the highways of the Commonwealth." Other titles contain the following: "To improve the public roads;" "the construction of State highways;" "the construction of macadamized roads in towns;" "aiding towns in the construction and maintenance of better roads," etc. These are cited as showing the evident purpose of the Legislature to improve and better the condition of the highways of the entire Commonwealth, and not especially of any particular part of it.

It could hardly be expected that all of the existing roadways would be taken over by the State, improved and maintained, but that such a selection should be made as in the judgment of the local authorities and the Highway Commission (for the law provides that both shall share in this selection) is justified by the necessities of the people, both generally and locally. If all State roads were to be newly laid out and built, it would require a most elaborate investigation and great judgment on the part of the commission to determine, even

with only a fair degree of approximation, where they should be located, that they might be of the greatest benefit to the greatest number. Fortunately, a much more certain process has been going on for about two hundred years, — the natural evolution of lines of travel and transportation, — and it may be confidently assumed to-day that where roads exist there are good reasons for their existence. In short, it seems to the commission that the surest evidence of a demand for public highways is their existence, and that their improvement and more perfect maintenance may wisely be made proportionate thereto. “To improve the public roads,” we must go where these roads are. When the Commonwealth or the national government appropriates a sum for the improvement of harbors, it naturally assumes that the money will be spent in that part of the State where harbors exist; and, in the just distribution of such a fund along the coast, regard would be had to the number of these harbors and their importance, as shown by their use, and not to the area of the counties in which they happened to be, or to other less directly related facts.

For these reasons, the commission agreed that the money for the construction of State roads would be “fairly apportioned” by dividing it in proportion to the amount of existing roadway. It further agreed that in determining county shares by this rule city streets should be omitted. The reasons for omitting city streets seemed obvious, being largely on account of the facts that city streets are for the most part already well paved; that they exist where the assessed valuation per mile of highway is greater, assistance from the State being, therefore, less needed; and especially that difficulties of administration would be almost certain to arise out of the mixed jurisdiction which would necessarily exist if city streets were to be taken as State roads. It ought to be said, however, that, if city streets were included in the calculation, the resulting apportionment would not differ materially from that now adopted.

Having established, as we believe, the correctness of the method of allotment which has been followed from the beginning, we desire to remark upon the limitation or restriction placed upon the commission by the clause of the statute which forbids the construction of more than ten miles of State road in one county in one year without permission from the governor and council.

In considering this provision of the act, it is of the utmost importance to bear in mind the fact that when it was adopted the appropriation for the entire cost of road construction, office and engineering expenses, for one year, was only \$300,000. Furthermore, it may be fairly assumed that the object of the restriction was to prevent the commission from going beyond what might be considered a “fair apportionment” to any one county, without the consent of the gov-



ernor and council. It was very well understood, at the time of the passage of the act, that under the system of apportionment adopted by the commission it would be impossible to construct as much as ten miles of roadway in one county in one year; but, as it was thought that conditions might possibly arise under which an excessive expenditure over and above what the mileage system of apportionment would permit might appear to be necessary or very desirable in the interests of economy, a permissive clause for doing this under approval of the governor and council was inserted in the act. Thus it appears very evident that this clause was not intended to interfere with the distribution of road construction under the system adopted by the commission, but, on the contrary, it was so drawn as to allow an expenditure in certain cases beyond what that system provided as a "fair apportionment." At that time no one foresaw that the annual appropriation would be more than doubled within three years. With the largely increased appropriation, together with the lessening cost of construction due to experience and better organization, a fair apportionment of construction compels the commission to build more than ten miles of road in one county in one year. If the limit beyond which it could not go without the permission of the governor and council was increased in proportion to the increase of the appropriation, as would be obviously just, it could not have been reached, and no such permission would have been required. That it was not intended to limit construction to ten miles of road in any one county in any one year under a \$300,000 appropriation is shown by the very paragraph under discussion; for it provides a way for the construction of any number of miles in excess of ten, if the reasons for so doing are satisfactory to the governor and council. It is difficult to see, therefore, why, under a \$600,000 or \$800,000 appropriation, an apportionment which still falls short of being "fair" according to the system always in use should be disapproved because it applies a construction somewhat in excess of ten miles. In other words, a provision of the statute which was made, under a \$300,000 appropriation, for the purpose of allowing, under certain conditions, an apportionment to a single county in excess of what was "fair" according to a general rule, becomes under a \$600,000 appropriation a restriction upon the commission which prevents it from making a "fair" apportionment, which by the same statute it is required to do.

The facts regarding Worcester County are as follows:—

Being by far the largest county in the Commonwealth, and by far the most important in agricultural industries, it has much the largest mileage of existing highways, its territory including 22 per cent. of the whole mileage of the State, excluding city streets.



By the rule of the commission it is entitled, therefore, to 22 per cent. of the sum available for road construction. From the beginning of road construction under the act of 1894 it has not been possible strictly to apply the road mileage system of apportionment, owing to a lack of acceptable petitions from some of the counties in the earlier years, the method of petitioning not being everywhere understood. This has resulted in a necessary under-allotment in some counties and an over-allotment in others. The allotments to Worcester County have always been somewhat short of the amount to which it is entitled. With an ample supply of petitions, the commission has endeavored to partially correct in the apportionment for this year the excesses and deficiencies of past allotments; but in the case of Worcester County, even if we are allowed to expend the amount which has been apportioned to that county, it will still be about \$56,000 short of what it is justly entitled to.

In our request to be allowed to build more than ten miles of road this year in Worcester County we are seeking for no special favor or consideration for that county, but only for permission to "fairly apportion" the construction of State roads, as is required by the statute. We have already shown that the necessity for such a request grows out of the fact alone that a limitation which was entirely proper under a small appropriation will, unless it is removed by permission of Your Excellency and the council, actually prevent a just and fair apportionment when the sum of money available is two or three times as large. Under such a ruling the disproportion of allotments will continually grow larger and larger, and the injustice to large counties continually greater and greater.

Believing that this is a condition neither implied by the letter of the law nor in harmony with its spirit, and being charged with the great responsibility of making, as far as we may be able, a fair apportionment of the money appropriated by the Legislature, we have ventured to present our views at some length, as explanatory of a respectful request for a reconsideration of the question by your honorable body.

Yours respectfully,

T. C. MENDENHALL,  
N. S. SHALER,  
W. E. McCLINTOCK,

*Massachusetts Highway Commission.*

## SHOWING THE EXPENDITURES FOR STATE HIGHWAYS IN THE VARIOUS COUNTIES OF THE STATE.

| COUNTY.             | Miles of Road.* | Per Cent. of Total Mileage. | Expended for Construction, 1894-97. | Per Cent. of Total Expended for Construction. | Expended and Allocated, 1898. | Per Cent. of Total Allowance. | Expended for Construction, Allocated in 1898 † | Per Cent. of Total Expended and Allocated. | Amounts to which Counties are entitled on Basis of Miles of Road. | Over Allowed. | Under Allowed. |
|---------------------|-----------------|-----------------------------|-------------------------------------|---|-------------------------------|-------------------------------|--|--|---|---------------|----------------|
| Barnstable, . . . . | 1,024           | 5.97                        | \$86,077 53                         | 5.453   | \$43,252 74                   | 6.847                         | \$129,330 27                                   | 5.551                                      | \$131,950 49  | -             | \$2,620 22     |
| Berkshire, . . . .  | 1,475           | 8.61                        | 138,272 13                          | 8.760   | 53,600 91                     | 8.485                         | 191,873 04                                     | 8.681                                      | 190,300 46  | \$1,572 58    | -              |
| Bristol, . . . .    | 963             | 5.62                        | 107,468 95                          | 6.808   | 20,591 07                     | 3.260                         | 128,060 02                                     | 5.794                                      | 124,214 70  | 3,845 32      | -              |
| Dukes, . . . .      | 190             | 1.14                        | 56,349 20                           | 3.569   | 726 45                        | .115                          | 57,075 65                                      | 2.582                                      | 25,196 58   | 31,879 07     | -              |
| Essex, . . . .      | 1,090           | 6.36                        | 105,622 63                          | 6.091   | 42,422 70                     | 6.715                         | 148,045 33                                     | 6.698                                      | 140,570 37  | 7,474 96      | -              |
| Franklin, . . . .   | 1,459           | 8.50                        | 106,104 07                          | 6.724   | 58,926 81                     | 9.328                         | 165,030 88                                     | 7.467                                      | 187,869 21  | -             | 22,838 33      |
| Hampden, . . . .    | 1,143           | 6.67                        | 133,538 35                          | 8.460   | 28,479 24                     | 4.508                         | 162,017 59                                     | 7.330                                      | 147,422 07  | 14,595 52     | -              |
| Hampshire, . . . .  | 1,186           | 6.92                        | 132,508 60                          | 8.394   | 23,482 99                     | 3.717                         | 155,991 59                                     | 7.058                                      | 152,947 64  | 3,043 95      | -              |
| Middlesex, . . . .  | 2,073           | 12.09                       | 146,931 84                          | 9.308   | 85,749 65                     | 13.574                        | 232,681 49                                     | 10.528                                     | 267,216 32  | -             | 34,534 83      |
| Nantucket, . . . .  | 114             | .67                         | 32,488 34                           | 2.058   | 6,221 98                      | .985                          | 38,710 32                                      | 1.752                                      | 14,808 51   | 23,901 81     | -              |
| Norfolk, . . . .    | 1,153           | 6.72                        | 99,751 26                           | 6.319   | 33,285 50                     | 5.269                         | 133,036 76                                     | 6.019                                      | 148,527 20  | -             | 15,490 44      |
| Plymouth, . . . .   | 1,458           | 8.50                        | 156,148 85                          | 9.892   | 30,412 35                     | 4.814                         | 186,561 20                                     | 8.441                                      | 187,869 21  | -             | 1,308 01       |
| Suffolk, . . . .    | 53              | .31                         | 266 87                              | .017  | 60,418 34                     | 9.554                         | 60,685 21                                      | 2.746                                      | 6,851 70  | 53,833 51     | -              |
| Worcester, . . . .  | 3,758           | 21.92                       | 276,974 56                          | 17.547  | 144,152 09                    | 22.819                        | 421,126 65                                     | 19.053                                     | 484,481 54  | -             | 63,354 89      |
| Totals, . . . .     | 17,145          | 100.00                      | \$1,575,503 18                      | 100.000                                       | \$831,722 82                  | 100.00                        | \$2,210,226 00                                 | 100.000                                    | \$2,210,226 00  | \$140,146 72  | \$140,146 72   |

\* Exclusive of city streets.

† Amount expended on completed roads and amount allotted on incomplete roads.

## APPENDIX G.

SHOWING THE ACTS AND RESOLVES UNDER  
WHICH THE WORK OF THE COMMISSION  
IS CARRIED ON.

[ACTS OF 1893, CHAPTER 476.]

AN ACT TO PROVIDE FOR THE APPOINTMENT OF A HIGHWAY COMMISSION TO IMPROVE THE PUBLIC ROADS AND TO DEFINE ITS POWERS AND DUTIES.

*Be it enacted, etc., as follows :*

SECTION 1. The governor, with the advice and consent of the council, shall, within thirty days after the passage of this act, appoint three competent persons, to serve as the Massachusetts Highway Commission. Their terms of office shall be so arranged and designated at the time of their appointment that the term of one member shall expire in three years, one in two years and one in one year. The full term of office thereafter shall be for three years, and all vacancies occurring shall be filled by the governor, with the advice and consent of the council. The members of said board may be removed by the governor, with the advice and consent of the council, for such cause as he shall deem sufficient and shall express in the order of removal. They shall each receive in full compensation for their services an annual salary of two thousand dollars, payable in equal monthly instalments, and also their travelling expenses. They may expend annually for clerk hire, engineers and for defraying expenses incidental to and necessary for the performance of their duties, exclusive of office rent, the sum of two thousand dollars. They shall be provided with an office in the state house or some other suitable place in the city of Boston, in which the records of their office shall be kept. They may establish rules and regulations for the conduct of business and for carrying out the provisions of this act.

Massachusetts  
Highway Com-  
mission, ap-  
pointment, term  
of office, com-  
pensation, etc.

To compile statistics, make investigations, advise officers, prepare maps, etc.

SECTION 2. They shall from time to time compile statistics relating to the public roads of cities, towns and counties, and make such investigations relating thereto as they shall deem expedient. They may be consulted at all reasonable times, without charge, by officers of counties, cities or towns having the care of and authority over public roads, and shall without charge advise them relative to the construction, repair, alteration or maintenance of the same; but advice given by them to any such officers shall not impair the legal duties and obligations of any county, city or town. They shall prepare a map or maps of the Commonwealth on which shall be shown county, city and town boundaries and also the public roads, particularly the state highways, giving, when practicable, the names of the same. They shall collect and collate information concerning the geological formation of this Commonwealth, so far as it relates to the material suitable and proper for road building, and shall, so far as practicable, designate on said map or maps the location of such material. Such map or maps shall at all reasonable times be open for the inspection of officers of counties, cities and towns having the care of and authority over public roads. They shall each year hold at least one public meeting in each county for the open discussion of questions relating to the public roads, due notice of which shall be given in the press or otherwise.

Massachusetts Highway Commission to hold public meetings.

Annual report, etc.

SECTION 3. They shall make an annual report to the legislature of their doings and the expenditures of their office, together with such statements, facts and explanations bearing upon the construction and maintenance of public roads, and such suggestions and recommendations as to the general policy of the Commonwealth in respect to the same as may seem to them appropriate. Their report shall be transmitted to the secretary of the Commonwealth on or before the first Wednesday in January of each year, to be laid before the legislature. All maps, plans and statistics collected and compiled under their direction shall be preserved in their office.

Officers to furnish commission with information.

SECTION 4. County commissioners and city and town officers having the care of and authority over public roads and bridges throughout the Commonwealth shall, on re-

quest, furnish the commissioners any information required by them concerning the roads and bridges within their jurisdiction.

SECTION 5. For the purpose of carrying out the pro- Expenditure.  
visions of this act said commission may expend such sums for necessary assistants, the procuring of necessary supplies, instruments, material, machinery and other property, and for the construction and maintenance of state highways, as shall from time to time be appropriated by the legislature; and they shall in their annual report state what sums they deem necessary for the year commencing with the first day of March following.

SECTION 6. Whenever the county commissioners of a  
county adjudge that the common necessity and convenience require that the Commonwealth acquire as a state highway a new or an existing road in that county, they may apply by petition in writing to the Massachusetts highway commission, stating the road they recommend, and setting forth a detailed description of said road by metes and bounds, together with a plan and profile of the same. Said commission shall consider such petition, and if they adjudge that it ought to be allowed, they shall in writing so notify said county commissioners. It shall then become the duty of said county commissioners to cause said road to be surveyed and laid out in the manner provided for the laying out and alteration of highways, the entire expense thereof to be borne and paid by said county. Said county commissioners shall preserve a copy of such petition, plans and profiles with their records for public inspection. When said commission shall be satisfied that said county commissioners have properly surveyed and laid out said road, and set in place suitable monuments, and have furnished said commission with plans and profiles, on which shall be shown such monuments and established grades, in accordance with the rules and regulations of said commission, said commission may approve the same, and so notify in writing said county commissioners. Said commission shall then present a certified copy of said petition, on which their approval shall be indicated, together with their estimates for constructing said road and the estimated annual cost

a State highway,  
proceedings  
upon petition  
of county com-  
missioners.  
Repealed, 1894.



for maintaining the same, to the secretary of the Commonwealth, who shall at once lay the same before the legislature, if it is in session, otherwise on the second Wednesday of January following. If the legislature makes appropriation for constructing said road, said commission shall cause said road to be constructed in accordance with this act, and when completed and approved by them said road shall become a state highway, and thereafter be maintained by the Commonwealth under the supervision of said commission.

State highway,  
proceedings  
upon petition of  
two or more  
cities or towns.  
Repealed, 1894.

SECTION 7. Two or more cities or towns may petition the said commission representing that, in their opinion, the common necessity and convenience require that the Commonwealth should acquire as a state highway a new or an existing road leading from one city or town to another, which petition shall be accompanied by a detailed description of such road by metes and bounds, and also a plan and profile of the same. If said commission adjudge that the common necessity and convenience require such road to be laid out and acquired as a state highway, they shall cause a copy of said petition, on which shall be their finding, to be given to the county commissioners of the county in which said road or any portion of it lies. It shall then become the duty of the county commissioners, at the expense of the county, to cause said road to be surveyed and laid out, and to set in place suitable monuments and to cause a detailed description by metes and bounds, plans and profiles to be made, on which shall be shown said monuments and established grades, and to give the same to said commission; but said county commissioners shall have the right to change the line of said road, provided the termini are substantially the same. Said county commissioners shall preserve said petition and a copy of the plans and profiles, with their records, for public inspection. When said commission shall be satisfied that the county commissioners have properly surveyed and laid out said road and set in place suitable monuments, and have furnished them with plans and profiles on which shall be shown said monuments and established grades, in accordance with the rules and regulations of said commission, they shall then proceed in

the same manner as provided in section six of this act; and when said road is completed and approved by said commission it shall become a state highway, and thereafter be maintained by the Commonwealth under the supervision of said commission.

SECTION 8. In all cases where a highway is to be constructed at the expense of the Commonwealth as a state highway, all the grading necessary to make said highway of the established grade, and the construction of culverts and bridges, shall be paid for by the county or counties, respectively, in which said highway or any portion of it lies, and the work must be done to the satisfaction of said commission. No action by a person claiming damage for the taking of land or change of grade, under the provisions of this act, shall be commenced against a county until said commission has taken possession for the purpose of constructing such state highway.

Grading, construction of culverts, bridges, etc., to be paid for by county. Repealed, 1894.

Action for damages.

SECTION 9. When appropriation has been made by the legislature for the construction of a state highway, said commission shall at once cause plans and specifications to be made and estimate the cost of the construction of such state highway, and give to each city and town in which said road lies, a certified copy of said plans and specifications, with a notice that said commission is ready for the construction of said road. Such city or town shall have the right, without advertisement, to contract with said commission for the construction of so much of such highway as lies within its limits, in accordance with the plans and specifications of the commission and under its supervision and subject to its approval, at a price agreed upon between said commission and said city or town; but such price agreed upon shall not exceed eighty-five per cent. of the original estimate of said commission. If such city or town shall within thirty days not elect to so contract, said commission may advertise in one or more papers published in the county where the road or portion of it is situated, and in one or more papers published in Boston, for bids for the construction of said highway in accordance with the plans and specifications furnished by said commission, and under their supervision and subject to their approval. Said commission shall

Proceedings when appropriation is made for construction. Repealed, 1894.

have the right to reject any and all bids, and they shall require of the contractor a bond for at least ten thousand dollars for each mile of road, to indemnify such city or town in which such highway lies against damage while such road is being constructed, and the Commonwealth shall not be liable for any damage occasioned thereby. Said commission shall make and sign all contracts in the name of the Massachusetts highway commission.

Maintenance.

SECTION 10. For the maintenance of state highways, said commission shall contract with the city or town in which such state highway lies, or a person, firm or corporation, for the keeping in repair and maintaining of such highway, in accordance with the rules and regulations of said commission, and subject to their supervision and approval, and such contracts may be made without previous advertisement.

Contracts subject to approval of governor and council.  
Repealed, 1894.

SECTION 11. All contracts made by or with the Massachusetts highway commission under the provisions of this act shall be subject to the approval of the governor and council.

Rights of adjoining owner or occupant, etc.

SECTION 12. No length of possession, or occupancy of land within the limit of any state highway, by an owner or occupier of adjoining land, shall create a right to such land in any adjoining owner or occupant or a person claiming under him, and any fences, buildings, sheds or other obstructions encroaching upon such state highway shall, upon written notice by said commission, at once be removed by the owner or occupier of adjoining land, and if not so removed said commission may cause the same to be done and may remove the same upon the adjoining land of such owner or occupier.

State highway, liability for injuries to property or persons, etc.  
Repealed, 1894.

SECTION 13. The Commonwealth shall be liable for injuries to persons or property occurring through a defect, or want of repair or of sufficient railing, in or upon a state highway.

Police jurisdiction, laying pipes, planting trees, etc.

SECTION 14. Cities and towns shall have police jurisdiction over all state highways, and they shall at once notify in writing the state commission or its employees of any defect or want of repair in such highways. No state highway shall be dug up for laying or placing pipes, sewers, posts, wires, railways or other purposes, and no

tree shall be planted or removed or obstruction placed thereon, except by the written consent of the superintendent of streets or road commissioners of a city or town, approved by the highway commission, and then only in accordance with the rules and regulations of said commission; and in all cases the work shall be executed under the supervision and to the satisfaction of said commission, and the entire expense of replacing the highway in as good condition as before shall be paid by the parties to whom the consent was given or by whom the work was done; but a city or town shall have the right to dig up such state highway without such approval of the highway commission where immediate necessity demands it, but in all such cases such highway shall be at once replaced in as good condition as before, and at the expense of the city or town. Said commission shall give suitable names to the state highways, and they shall have the right to change the name of any road that shall have become a part of a state highway. They shall cause to be erected, at convenient points along state highways, suitable guide posts.

Names, guide  
posts, etc.

SECTION 15. The word "road," as used in this act includes every thoroughfare which the public has a right to use.

The word  
"road" defined.

SECTION 16. This act shall take effect upon its passage.

*Approved June 10, 1893.*

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[ACTS OF 1894, CHAPTER 497.]

#### AN ACT RELATING TO STATE HIGHWAYS.

*Be it enacted, etc., as follows:*

SECTION 1. Whenever the county commissioners of a county, or the mayor and aldermen of a city, or the selectmen of a town, adjudge that the public necessity and convenience require that the Commonwealth take charge of a new or an existing road as a highway, in whole or in part, in that county, city or town, they may apply by a petition in writing to the Massachusetts highway commission, stating the road they recommend, together with a plan and profile of the same.

Petition for the  
taking of certain  
roads as state  
highways.



Proceedings of  
highway com-  
missioners upon  
petition, etc.

SECTION 2. Said highway commission shall consider such petition and determine what the public necessity and convenience require in the premises, and, if they deem that the highway should be laid out or be taken charge of by the Commonwealth, shall file a plan thereof in the office of the county commissioners of the county in which the petitioners reside, with the petition therefor and a certificate that they have laid out and taken charge of said highway in accordance with said plan, and shall file a copy of the plan and location of the portion lying in each city or town in the office of the clerk of said city or town, and said highway shall, after the filing of said plans, be laid out as a highway, and shall be constructed and kept in good repair and condition as a highway by the said commission, at the expense of the Commonwealth, and shall be known as a state road, and thereafter be maintained by the Commonwealth under the supervision of said commission. And all openings and placing of structures in any such road shall be done in accordance with a permit from said commission.

Damages.

SECTION 3. The damages sustained by any person whose property is taken for, or is injured by the construction of any such highway shall be paid by the Commonwealth, the same to be determined by said commission. And if said commission and the person sustaining the damages cannot agree thereon he or they may have said damages determined by a jury in the county in which the land is situated, by filing a petition for such jury in the office of the clerk of the superior court for said county at any time before the expiration of one year from the completion of said highway, and thereupon said damages shall be determined by a jury at the bar of said court, in the same manner as damages for the taking of land for other highways in the county, city or town are determined; and costs shall be taxed to the prevailing party on such petition, as in civil cases.

Construction of  
highways,  
notice to cities  
and towns, bids,  
proposals, etc.

SECTION 4. Said commission shall, when about to construct any highway, give to each city and town in which said highway lies a certified copy of the plans and specifications for said highway, with a notice that said commission is ready for the construction of said road. Such city



or town shall have the right, without advertisement, to contract with said commission for the construction of so much of such highway as lies within its limits, in accordance with the plans and specifications, and under its supervision and subject to its approval, at a price agreed upon between said commission and said city or town. If said city or town shall not elect to so contract within thirty days said commission shall advertise in two or more papers published in the county where the road or portion of it is situated, and in three or more daily papers published in Boston, for bids for the construction of said highway under their supervision and subject to their approval, in accordance with plans and specifications to be furnished by said commission. Such advertisements shall state the time and place for opening the proposals in answer to said advertisements, and reserve the right to reject any and all proposals. All such proposals shall be sealed and shall be kept by the board, and shall be open to public inspection after said proposals have been accepted or rejected. Said commission may reject any or all bids, or if a bid is satisfactory they shall, with the approval of the governor and council, make a contract in writing on behalf of the Commonwealth for said construction, and shall require of the contractor a bond for at least twenty-five per cent. of the contract price to indemnify any city or town in which such highway lies against damage while such road is being constructed; and the Commonwealth shall not be liable for any damage occasioned thereby. All construction of state roads shall be fairly apportioned by said commission among the different counties, and not more than ten miles of state road shall be constructed in any one county in any one year on petition as aforesaid, without the previous approval thereof in writing by the governor and council.

Construction to be apportioned among the different counties.

SECTION 5. One quarter of any money expended under the provisions of this act in any county for a highway, with interest on said quarter at the rate of three per cent. per annum, shall be repaid by said county to the Commonwealth, in such reasonable sums and at such times within six years thereafter as said commission, with the approval of the state auditor, shall determine, taking into

Portion of money expended to be repaid by county, etc.

consideration the financial condition of the county; and the treasurer and receiver-general shall apply all money so repaid to the appropriation to be expended by said commission. The county treasurer, with the approval of the county commissioners, may make such loans as they may see fit to meet this expenditure.

Cities and towns  
to be liable for  
injuries to per-  
sons, etc.

SECTION 6. Any city or town in which a state highway is situated shall be liable for injuries to persons travelling upon a state highway the same as upon other highways, but the amount actually recovered as damages for such injuries shall be repaid within one year thereafter to such city or town by the Commonwealth. A city or town may make temporary necessary repairs of a state highway without the approval of said commission.

Shade trees,  
watering  
troughs, etc.

SECTION 7. Said commission shall keep all state roads reasonably clear of brush, and shall cause suitable shade trees to be set out along said highways when feasible, and shall renew the same when necessary, and may also establish and maintain watering troughs at suitable places along said highways.

State Highway  
Loan.

SECTION 8. For the purpose of meeting any expenses that may be incurred under the provisions of chapter four hundred and seventy-six of the acts of the year eighteen hundred and ninety-three, as hereby amended, including the salaries and expenses of the commission, the treasurer and receiver-general is hereby authorized, with the approval of the governor and council, to issue scrip or certificates of indebtedness to an amount not exceeding three hundred thousand dollars, for a term not exceeding thirty years. Said scrip or certificates of indebtedness shall be issued as registered bonds or with interest coupons attached, and shall bear interest not exceeding four per centum per annum, payable semi-annually on the first days of April and October in each year. Such scrip or certificates of indebtedness shall be designated on the face as the State Highway Loan, shall be countersigned by the governor, and shall be deemed a pledge of the faith and credit of the Commonwealth, and the principal and interest shall be paid at the times specified therein in gold coin of the United States or its equivalent; and said

scrip or certificates of indebtedness shall be sold and disposed of at public auction or in such other mode and at such times and prices and in such amounts and at such rates of interest, not exceeding the rate above specified, as shall be deemed best. The treasurer and receiver-general shall, on issuing any of said scrip or certificates of indebtedness, establish a sinking fund for the payment of said bonds, into which shall be paid any premiums received on the sale of said bonds, and he shall apportion thereto from year to year, in addition, amounts sufficient with the accumulations to extinguish at maturity the debt incurred by the issue of said bonds. The amount necessary to meet the annual sinking fund requirements and to pay the interest on said bonds shall be raised by taxation from year to year. Sinking fund.

SECTION 9. Sections six, seven, eight, nine, eleven and thirteen of chapter four hundred and seventy-six of the acts of the year eighteen hundred and ninety-three are hereby repealed. Repeal.

SECTION 10. This act shall take effect upon its passage.  
*Approved June 20, 1894.*

[ACTS OF 1895, CHAPTER 92.]

AN ACT MAKING APPROPRIATIONS FOR EXPENSES OF THE  
 MASSACHUSETTS HIGHWAY COMMISSION.

*Be it enacted, etc., as follows :*

SECTION 1. The sums hereinafter mentioned are appropriated, to be paid out of the state highway loan fund, to meet expenses of the Massachusetts highway commission for the year ending on the thirty-first day of December in the year eighteen hundred and ninety-five, to wit: — Appropriations.

For rent of office, including care, heating and lighting the same, a sum not exceeding one thousand dollars, this amount being in addition to the sum heretofore appropriated for rent in an act passed the present year. Highway commission, rent, etc.

For the salaries of clerks and such clerical assistance as said commission may find necessary, a sum not exceeding five thousand dollars. Clerks.

|                      |  |
|----------------------|--|
| Chief engineer.      | For the salary of the chief engineer, a sum not exceeding three thousand dollars.  |
| Incidental expenses. | For incidental and contingent expenses of said commission, a sum not exceeding fifteen hundred dollars.  |
| Travelling expenses. | For travelling expenses of said commission, a sum not exceeding fifteen hundred dollars.   |
| Surveys of roads.    | For expenses in connection with surveys of roads, for the purpose of laying out and building state highways, a sum not exceeding ten thousand dollars. |

SECTION 2. This act shall take effect upon its passage.

*Approved March 7, 1895.*

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[ACTS OF 1895, CHAPTER 347.]

AN ACT RELATIVE TO THE CONSTRUCTION OF STATE HIGHWAYS.

*Be it enacted, etc., as follows :*

|  |   |
|--|---|
| Construction of state highways.            | SECTION 1. The Massachusetts highway commission is hereby authorized to expend a sum not exceeding four hundred thousand dollars for the construction of state highways during the current year, in accordance with the provisions of chapter four hundred and seventy-six of the acts of the year eighteen hundred and ninety-three and chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four.  |
| No persons except citizens to be employed. | SECTION 2. No persons except citizens of this Commonwealth shall be employed on the work authorized by this act.  |
| State Highway Loan.                        | SECTION 3. For the purpose of meeting any expenses which may be incurred under the provisions of this act the treasurer and receiver-general is hereby authorized, with the approval of the governor and council, to issue scrip or certificates of indebtedness to an amount not exceeding four hundred thousand dollars, for a term not exceeding thirty years. Said scrip or certificates of indebtedness shall be issued as registered bonds or with interest coupons attached, and shall bear interest not exceeding four per cent. per annum, payable semi-annually on the first days of April and October in each year. Such scrip or certificates of indebtedness shall be desig- |



nated on their face as the State Highway Loan, shall be countersigned by the governor, and shall be deemed the pledge of the faith and credit of the Commonwealth; and the principal and interest thereof shall be paid at the times specified therein in gold coin of the United States or its equivalent; and said scrip or certificates of indebtedness shall be sold and disposed of at public auction, or in such other manner, at such times and prices, in such amounts and at such rates of interest, not exceeding the rate above specified, as shall be deemed best. The sinking fund established by chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four shall also be maintained for the purpose of extinguishing bonds issued under the authority of this act, and the treasurer and receiver-general shall apportion thereto from year to year an amount sufficient with the accumulations of said fund to extinguish at maturity the debt incurred by the issue of said bonds. The amount necessary to meet the annual sinking fund requirements and to pay the interest on said bonds shall be raised by taxation from year to year.

SECTION 4. This act shall take effect upon its passage.

*Approved May 1, 1895.*

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[ACTS OF 1895, CHAPTER 486.]

AN ACT RELATIVE TO THE CONSTRUCTION OF MACADAMIZED  
ROADS IN TOWNS.

*Be it enacted, etc., as follows:*

SECTION 1. When a town of not less than ten thousand inhabitants, or not less than two nor more than five adjoining towns whose combined population does not exceed twelve thousand, vote at a town meeting to expend not less than three thousand dollars per year each year for the term of five years, in the case of a single town, or four thousand dollars each year for the term of five years when not less than two nor more than five towns unite together, for macadamized roads, the Commonwealth shall furnish out of the state highway loan authorized by chapter three hundred and forty-seven of the acts of the present

Commonwealth  
to furnish  
certain towns  
with steam road  
rollers.



year, through the Massachusetts highway commission, to such town or towns, free of charge a steam road roller of approved pattern and suitable size, for the sole use of such town or towns during said five years and as long thereafter as they continue to expend not less than fifty per cent. of the above-mentioned sum on macadamized roads each year: *provided, nevertheless*, that if said town or towns fail to expend said sum for macadamized roads in any one year, such road roller shall then revert to the Commonwealth. Said town or towns shall keep said roller in good repair.

Joint use of  
rollers by  
certain towns.

Period for  
macadamizing  
roads.

Amount to be  
expended.

SECTION 2. When not less than two nor more than five towns use a roller jointly, the town voting the largest proportion of the required sum shall have the first chance as to the time of using it, and may retain possession of it each year for a length of time proportionate to the sum voted by said town. The six months between the first day of May and the first day of November in each year shall be deemed the proper period for macadamizing roads.

SECTION 3. The Massachusetts highway commission shall not expend more than nine thousand dollars in carrying out the provisions of this act during the year eighteen hundred and ninety-five.

SECTION 4. This act shall take effect upon its passage.

*Approved June 5, 1895.*

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[RESOLVES OF 1896, CHAPTER 86.]

RESOLVE RELATIVE TO A STATE HIGHWAY BETWEEN THE CITY OF BOSTON AND THE CITY OF NEWBURYPORT.

State highway  
between Boston  
and Newbury-  
port.

*Resolved*, That the Massachusetts highway commission consider the expediency of laying out a state highway between the city of Boston and the city of Salem or the city of Newburyport, over the shore route, so called, which route may be described substantially as follows:—

Starting from the south ferry, at Lewis street, in Boston, thence through Lewis street to Maverick square, thence through Maverick square to Chelsea street, thence over Chelsea street to Bennington street, thence over

Bennington street to Orient Heights, thence over the main traveled road to the town of Revere, continuing on the main road to Beachmont, continuing over the main traveled road, known as Ocean avenue, along the ocean front to the Point of Pines, crossing the Saugus river on the easterly side of the Boston, Revere Beach and Lynn railroad and running to the south end of Sea street in Lynn, thence through Sea street to Broad street, thence through Broad street to Lewis street, thence through Lewis street to New Ocean street, thence through New Ocean street to the town of Swampscott, thence through New Ocean street, in Swampscott, to the junction of Burrill street and Paradise road, thence over Paradise road to the northeast end of said road, thence through Paradise woods on nearly a straight line to Vinin square, at the junction of the towns of Swampscott and Marblehead and the city of Salem, thence northerly to Loring avenue in the city of Salem, thence over Loring avenue to Lafayette street, thence over Lafayette street to Central street, thence over Central street to Essex street, thence through Salem to and over Beverly bridge, thence through the city of Beverly, and thence to Newburyport, using the present traveled roads as far as may be, with such additions of new road as may be necessary. Said Massachusetts highway commission shall report to the next general court the probable cost of such a highway, with such other information as may be obtained in relation thereto, on or before the thirty-first day of January in the year eighteen hundred and ninety-seven.

*Approved April 28, 1896.*

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[ACTS OF 1896, CHAPTER 345.]

#### AN ACT RELATIVE TO STATE HIGHWAYS.

*Be it enacted, etc., as follows:*

SECTION 1. When a highway is laid out as a state road the Massachusetts highway commission shall construct and maintain that portion of the way between the inside lines of sidewalks upon either side. The sidewalks of said road may be constructed and maintained in accordance with the

Construction,  
etc., of state  
highways.

Sidewalks.

Public Statutes and amendments thereto, and the provisions of section six of chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four shall only apply to that portion of the way between the inside lines of sidewalks. The inside lines of sidewalks referred to in this section are those lines which are nearest to the centre of the highway.

State roads to be kept clear of snow and ice, etc.

SECTION 2. A city or town in which a state road lies shall at its own expense keep such road sufficiently clear of snow and ice so that the same shall be reasonably safe for travel, as now required by the Public Statutes and amendments thereto.

Copy of petition may be filed with county commissioners.

SECTION 3. Instead of filing the original petition with the county commissioners, as now required by section two of chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four, it shall hereafter be sufficient to file a certified copy thereof with said county commissioners.

SECTION 4. This act shall take effect upon its passage.

*Approved April 28, 1896.*

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[ACTS OF 1896, CHAPTER 481.]

AN ACT RELATIVE TO THE CONSTRUCTION OF STATE  
HIGHWAYS.

*Be it enacted, etc., as follows :*

Construction of state highways.

SECTION 1. The Massachusetts highway commission is hereby authorized to expend a sum not exceeding six hundred thousand dollars for the construction of state highways, in accordance with the provisions of chapter four hundred and seventy-six of the acts of the year eighteen hundred and ninety-three and chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four.

Only citizens of the Commonwealth to be employed.

SECTION 2. No persons except citizens of this Commonwealth shall be employed on the work authorized by this act.

State Highway Loan.

SECTION 3. For the purpose of meeting any expenses which may be incurred under the provisions of this act the treasurer and receiver general is hereby authorized,

with the approval of the governor and council, to issue scrip or certificates of indebtedness to an amount not exceeding six hundred thousand dollars, for a term not exceeding thirty years. Said scrip or certificates of indebtedness shall be issued as registered bonds or with interest coupons attached, and shall bear interest not exceeding four per cent. per annum, payable semi-annually on the first day of April and of October in each year. Such scrip or certificates of indebtedness shall be designated on their face as the State Highway Loan, shall be countersigned by the governor, and shall be deemed a pledge of the faith and credit of the Commonwealth; and the principal and interest thereof shall be paid at the times specified therein in gold coin of the United States or its equivalent, and said scrip or certificates of indebtedness shall be sold and disposed of at public auction, or in such other manner, at such times and prices, in such amounts and at such rates of interest, not exceeding the rate above-specified, as shall be deemed best. The sinking fund <sup>Sinking fund, etc.</sup> established by chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four shall also be maintained for the purpose of extinguishing bonds issued under the authority of this act, and the treasurer and receiver general shall apportion thereto from year to year an amount sufficient with the accumulations of said fund to extinguish at maturity the debt incurred by the issue of said bonds. The amount necessary to meet the annual sinking fund requirements and to pay the interest on said bonds shall be raised by taxation from year to year.

SECTION 4. This act shall take effect upon its passage.

*Approved June 4, 1896.*

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[ACTS OF 1896, CHAPTER 513.]

AN ACT TO PROVIDE FOR AIDING TOWNS IN THE CONSTRUCTION AND MAINTENANCE OF BETTER ROADS.

*Be it enacted, etc., as follows:*

SECTION 1. Upon the application to the Massachusetts highway commission of the county commissioners of any <sup>Road machines to be furnished at the expense</sup>



of the Commonwealth for use in certain towns, etc.

county, made at the request of any town of not more than twelve thousand inhabitants within said county, there shall be furnished by said highway commission to said county, at the expense of the Commonwealth, one or more steam rollers, portable stone crushers and such other road machines as the said highway commission may deem necessary for the construction and maintenance of better roads in the town making such request. Such machines shall remain the property of the Commonwealth and shall be managed and maintained under the direction of the county commissioners. The county commissioners shall engage competent engineers and skilled mechanics to operate said machines, who shall be paid from the county treasury such sums for each day's actual services as the county commissioners may determine. The expenses so incurred shall be repaid to the county by the towns using said machines, as apportioned by the county commissioners, in proportion to the time in which such machines were used by them.

Repeal.

SECTION 2. Chapter four hundred and eighty-six of the acts of the year eighteen hundred and ninety-five is hereby repealed.

SECTION 3. This act shall take effect upon its passage.

*Approved June 6, 1896.*

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[ACTS OF 1896, CHAPTER 541.]

# AN ACT RELATIVE TO STREET RAILWAYS LOCATED ON STATE HIGHWAYS.

*Be it enacted, etc., as follows:*

Location of street railways on state highways may be changed, etc.

SECTION 1. Whenever in the construction of a state highway it becomes necessary, in the opinion of the Massachusetts highway commission, to change the location, relay or change the grade of that part of any street railway located on said highway, or to place different material between its tracks, or to make any other change in the location and construction of said railway, said commission may, in the manner provided in section twenty-two of chapter one hundred and thirteen of the Public Statutes for making such changes by boards of aldermen and select-



men, order the company owning or operating said railway to make such changes: *provided, however*, that the company shall thereafter enjoy the same rights in the new location that it had in the original location; and unless the same are made within the time limited by said commission the commission may make said changes, and the cost of making the same, whether by the railway company or by said commission, shall be paid by said commission; said cost with interest at a rate not exceeding four per cent. per annum, shall be paid by said railway company to the Commonwealth in ten equal annual payments; and the auditor of the Commonwealth on or before the first day of July in each year shall certify the amount due to the tax commissioner, who shall forthwith demand the same; and payment shall be made within thirty days thereafter. The claim of the Commonwealth shall have priority over all other claims against said railway company, except for labor, and shall be collected in the same manner as the corporation tax; but any such company may itself pay for the expenses of said changes at the time of making the same, and may anticipate said annual payments in whole or in part.

Proviso.

SECTION 2. This act shall take effect upon its passage.

*Approved June 9, 1896.*

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[ACTS OF 1896, CHAPTER 548.]

AN ACT MAKING APPROPRIATIONS FOR EXPENSES AUTHORIZED BY THE PRESENT LEGISLATURE AND FOR CERTAIN OTHER EXPENSES AUTHORIZED BY LAW.

*Be it enacted, etc., as follows:*

For expenses in connection with aiding towns in the construction and maintenance of better roads, as authorized by chapter five hundred and thirteen of the acts of the present year, a sum not exceeding twelve thousand dollars.

Construction of better roads.

SECTION 2. This act shall take effect upon its passage.

*Approved June 9, 1896.*

[ACTS OF 1897, CHAPTER 15.]

AN ACT MAKING AN APPROPRIATION FOR THE STATE  
HIGHWAY LOAN SINKING FUND.*Be it enacted, etc., as follows:*Appropriation  
of \$28,372 for  
State Highway  
Loan Sinking  
Fund.

SECTION 1. The sum of twenty-eight thousand three hundred and seventy-two dollars is hereby appropriated, to be paid out of the treasury of the Commonwealth from the ordinary revenue, for the State Highway Loan Sinking Fund, as provided for in section eight of chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four, said sum being the estimate of the treasurer and receiver-general.

SECTION 2. This act shall take effect upon its passage.

*Approved February 2, 1897.*

[ACTS OF 1897, CHAPTER 276.]

AN ACT TO PERMIT THE RELOCATION OF A CERTAIN HIGH-  
WAY OVER THE LAND OF THE TRUSTEES OF THE WEST-  
BOROUGH INSANE HOSPITAL.*Be it enacted, etc., as follows:*Highway over  
Westborough  
insane hospital  
land, etc.

SECTION 1. The trustees of the Westborough insane hospital are hereby authorized to permit the relocation of the highway leading over land of the said trustees, past the buildings of the Westborough insane hospital, over other land of the said trustees, in such place and according to such plan as the said trustees may approve. And the Massachusetts highway commission may relocate and build said highway during the year eighteen hundred and ninety-seven, and may pay for building the same out of any funds that may hereafter be authorized to be expended by said commission.

SECTION 2. This act shall take effect upon its passage.

*Approved April 14, 1897.*

[ACTS OF 1897, CHAPTER 340.]

AN ACT RELATIVE TO THE CONSTRUCTION AND REPAIR OF  
STATE HIGHWAYS.*Be it enacted, etc., as follows :*

SECTION 1. The Massachusetts highway commission is hereby authorized to expend a sum not exceeding eight hundred thousand dollars for the construction and repair of state highways, in accordance with the provisions of the statutes relating to and defining the powers and duties of said commission. Said commission may make contracts during the present calendar year for the whole amount hereby authorized to be expended, but the contracts shall be so made that the amount to be paid from the state treasury during the present calendar year shall not exceed six hundred thousand dollars.

Highway  
Commission  
may expend  
\$800,000.\$600,000 only to  
be used in 1897.

SECTION 2. No persons except citizens of this Commonwealth shall be employed on the work authorized by this act.

Citizens of  
Massachusetts  
only to be  
employed.

SECTION 3. For the purpose of meeting any expenses which may be incurred under the provisions of this act the treasurer and receiver-general is hereby authorized, with the approval of the governor and council, to issue scrip or certificates of indebtedness to an amount not exceeding eight hundred thousand dollars, for a term not exceeding thirty years. Said scrip or certificates of indebtedness shall be issued as registered bonds or with interest coupons attached, and shall bear interest not exceeding four per cent. per annum, payable semi-annually on the first days of April and October in each year. Such scrip or certificates of indebtedness shall be designated on their face as the State Highway Loan, shall be countersigned by the governor, and shall be deemed a pledge of the faith and credit of the Commonwealth; and the principal and interest thereof shall be paid at the times specified therein in gold coin of the United States or its equivalent, and said scrip or certificates of indebtedness shall be sold and disposed of at public auction, or in such other manner, at such times and prices, in such amounts and at such rates of interest, not exceeding the

Loan authorized  
of \$800,000, not  
exceeding 30  
years, not ex-  
ceeding 4 per  
cent. interest,  
April and  
October.State Highway  
Loan.Gold coin of the  
United States or  
its equivalent.

Sinking fund  
already estab-  
lished to cover  
this loan.

Amount  
necessary to  
be raised by  
taxation.

rate above-specified, as shall be deemed best. The sinking fund established by chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four shall also be maintained for the purpose of extinguishing bonds issued under the authority of this act, and the treasurer and receiver general shall apportion thereto from year to year an amount sufficient with the accumulations of said fund to extinguish at maturity the debt incurred by the issue of said bonds. The amount necessary to meet the annual sinking fund requirements and to pay the interest on said bonds shall be raised by taxation from year to year.

SECTION 4. This act shall take effect upon its passage.

*Approved May 5, 1897.*

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[ACTS OF 1897, CHAPTER 355.]

#### AN ACT RELATIVE TO STATE HIGHWAYS.

*Be it enacted, etc., as follows :*

Chap. 497, 1894,  
amended.

SECTION 1. Section two of chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four is hereby amended by inserting after the word "file", in the fifth line of said section, the words:—a certified copy of,—and by striking out the last sentence of said section and inserting in place thereof the words:—No opening shall be made in any such road, nor any structure placed therein, nor shall there be made any change or removal of structures already placed therein, except with the approval of and in accordance with a permit from said commission, which shall exercise complete and permanent jurisdiction over state highways,—so as to read as follows:—*Section 2.* Said highway commission shall consider such petition and determine what the public necessity and convenience require in the premises, and, if they deem that the highway should be laid out or be taken charge of by the Commonwealth, shall file a certified copy of a plan thereof in the office of the county commissioners of the county in which the petitioners reside, with the petition therefor and a certificate that they have laid out and taken charge

Highway com-  
missioners to  
receive petitions  
for highways,  
and their duties  
in such cases  
defined.



of said highway in accordance with said plan, and shall file a copy of the plan and location of the portion lying in each city or town in the office of the clerk of said city or town, and said highway shall, after the filing of said plans, be laid out as a highway, and shall be constructed and kept in good repair and condition as a highway by said commission, at the expense of the Commonwealth, and shall be known as a state road, and thereafter be maintained by the Commonwealth under the supervision of said commission. No opening shall be made in any such road, nor any structure placed therein, nor shall there be made any change or removal of structures already placed therein, except with the approval of and in accordance with a permit from said commission, which shall exercise complete and permanent jurisdiction over state highways.

SECTION 2. Section four of said chapter four hundred and ninety-seven is hereby amended by inserting after the word "thereby", in the thirty-third line, the words:—The commission shall also have power to contract in the manner and under the conditions hereinbefore specified with a city or town, or with private bidders when a city or town shall not elect so to contract, for the grading of a state highway, or for furnishing materials or any other element in the construction of such highway,—so as to read as follows:—*Section 4.* Said commission shall, when about to construct any highway, give to each city and town in which said highway lies a certified copy of the plans and specifications for said highway, with a notice that said commission is ready for the construction of said road. Such city or town shall have the right, without advertisement, to contract with said commission for the construction of so much of such highway as lies within its limits, in accordance with the plans and specifications, and under its supervision and subject to its approval, at a price agreed upon between said commission and said city or town. If said city or town shall not elect to so contract within thirty days said commission shall advertise in two or more papers published in the county where the road or portion of it is situated, and in three or more daily papers published in

Chap. 497, 1894,  
amended.

Commission to  
furnish plans  
to towns and  
cities, etc.

Cities and towns  
may contract  
with commis-  
sion to construct  
highways.

Commission  
may advertise  
for bids in  
certain cases.



Boston, for bids for the construction of said highway under their supervision and subject to their approval, in accordance with plans and specifications to be furnished by said commission. Such advertisement shall state the time and place for opening the proposals in answer to said advertisements, and reserve the right to reject any and all proposals. All such proposals shall be sealed and shall be kept by the board, and shall be open to public inspection after said proposals have been accepted or rejected. Said commission may reject any or all bids, or if a bid is satisfactory they shall, with the approval of the governor and council, make a contract in writing on behalf of the Commonwealth for said construction, and shall require of the contractor a bond for at least twenty-five per cent. of the contract price to indemnify any city or town in which such highway lies, against damage while such road is being constructed; and the Commonwealth shall not be liable for any damage occasioned thereby. The commission shall also have power to contract in the manner and under the conditions hereinbefore specified with a city or town, or with private bidders when a city or town shall not elect so to contract, for the grading of a state highway, or for furnishing materials or any other element in the construction of such highway. All construction of state roads shall be fairly apportioned by said commission among the different counties, and not more than ten miles of state road shall be constructed in any one county in any one year on petition as aforesaid, without the previous approval thereof in writing by the governor and council.

May reject bids.

Not more than 10 miles of road to be constructed in any county in any one year unless, etc.

Chap. 513, 1896, amended.

Commission may furnish counties, at expense of Commonwealth, steam rollers, crushers, etc.

SECTION 3. Section one of chapter five hundred and thirteen of the acts of the year eighteen hundred and ninety-six is hereby amended by striking out the whole of said section and inserting in place thereof the following: —  
*Section 1.* Upon the application to the Massachusetts highway commission of the county commissioners of any county, made at the request of any town of not more than twelve thousand inhabitants within said county, there shall be furnished by said highway commission to said county, at the expense of the Commonwealth, such steam rollers, portable stone crushers, and other road machines

as the said highway commission may deem necessary for the construction and maintenance of better roads in the county from which such a request comes. Such machines shall remain the property of the Commonwealth and shall be managed and maintained under the direction of the county commissioners, and they shall at all times be cared for in a manner satisfactory to the highway commission. The county commissioners shall engage competent engineers and skilled mechanics to operate said machines, who shall be paid from the county treasury such sums for each day's actual services as the county commissioners may determine. The expenses so incurred shall be repaid to the county by the Commonwealth or by the towns using said machines, as apportioned by the county commissioners, in proportion to the time during which such machines were used by such towns. Whenever any part of a state highway shall have been constructed in a county where there is road machinery purchased under the provisions of this act the highway commission shall have the right to use said machinery at such times as said road machinery is not in use by any town, for the maintenance and repair of such highway.

Such machines to remain property of Commonwealth under care of county commissioners, etc.

Expenses of said machines to be repaid by counties or towns.

Commission has right to use said machines.

SECTION 4. The provisions of section one of chapter five hundred and forty-one of the acts of the year eighteen hundred and ninety-six shall apply to the repair of a state highway as well as to the construction thereof.

SECTION 5. All payments made to the Commonwealth under the provisions of said chapter five hundred and forty-one shall be credited to the fund for the construction of state highways: *provided*, that such a fund exists at the time the payment is made, otherwise they shall be credited to the general fund of the Commonwealth.

*Approved May 6, 1897.*

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[RESOLVES OF 1897, CHAPTER 95.]

RESOLVE TO PROVIDE FOR ADDITIONAL COPIES OF THE REPORT OF THE MASSACHUSETTS HIGHWAY COMMISSION.

*Resolved*, That two thousand additional copies of the fourth annual report of the Massachusetts highway com-

2,000 additional copies of report to be printed.

mission be printed and bound in cloth. Out of the number so printed each member of the present general court shall be entitled to receive five copies, and the residue shall be distributed under the direction of the commission. Beginning with the year eighteen hundred and ninety-eight there shall be printed annually four thousand copies of the report of said commission, and each member of the general court shall be entitled to receive ten copies.

*Approved June 11, 1897.*

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[ACTS OF 1898, CHAPTER 38.]

AN ACT MAKING AN APPROPRIATION FOR THE STATE HIGHWAY LOAN SINKING FUND.

*Be it enacted, etc., as follows :*

State Highway  
Loan Sinking  
Fund.

SECTION 1. The sum of forty-seven thousand two hundred seventy-three dollars and fifty-seven cents is hereby appropriated, to be paid out of the treasury of the Commonwealth from the ordinary revenue, for the State Highway Loan Sinking Fund, as provided for by section eight of chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four, said sum being the estimate of the treasurer and receiver general.

SECTION 2. This act shall take effect upon its passage.

*Approved February 8, 1898.*

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[ACTS OF 1898, CHAPTER 476.]

AN ACT RELATIVE TO STATE HIGHWAYS.

*Be it enacted, etc., as follows :*

1894, 497, § 1,  
amended.

SECTION 1. Section one of chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four is hereby amended by striking out all after the word "commission", in the seventh and eighth lines, and inserting in place thereof the words:—requesting that said road may be taken charge of by the Commonwealth,—so as to read as follows: *Section 1.* Whenever the county commissioners of a county, or the mayor and aldermen of a city, or the selectmen of a town, ad-

Petition for the  
taking of cer-  
tain roads as  
state highways.

judge that the public necessity and convenience require that the Commonwealth take charge of a new or an existing road as a highway, in whole or in part, in that county, city or town, they may apply by a petition in writing to the Massachusetts highway commission, requesting that said road may be taken charge of by the Commonwealth.

SECTION 2. This act shall take effect upon its passage.

*Approved May 27, 1898.*

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[ACTS OF 1898, CHAPTER 528.]

AN ACT RELATIVE TO STATE HIGHWAYS.

*Be it enacted, etc., as follows :*

SECTION 1. Section one of chapter four hundred and seventy-six of the acts of the year eighteen hundred and ninety-three is hereby amended by striking out all after the word "removal", in the fourteenth line, and inserting in place thereof the following:—They shall each receive, in full compensation for their services, an annual salary of two thousand dollars, payable in equal monthly instalments, and also their travelling expenses, and they may expend annually for clerk hire, engineers, and for defraying expenses incidental and necessary for the performance of their duties, exclusive of office rent, such sum as the legislature shall from time to time appropriate. All of these sums shall be paid from the treasury of the Commonwealth. They shall be provided with an office in the state house or some other suitable place in the city of Boston, in which the records of their office shall be kept. They may establish rules and regulations for the conduct of business and for carrying out the provisions of the different acts governing the state highway commission.

1893, 476, § 1,  
amended.

Compensation  
of state highway  
commissioners,  
etc.

SECTION 2. All acts and parts of acts inconsistent with this act are hereby repealed.

SECTION 3. This act shall take effect upon its passage.

*Approved June 14, 1898.*

[ACTS OF 1898, CHAPTER 539.]

AN ACT RELATIVE TO THE CONSTRUCTION AND REPAIR OF  
STATE HIGHWAYS.*Be it enacted, etc., as follows :*Construction  
and repair of  
state highways.

SECTION 1. The Massachusetts highway commission is hereby authorized to expend a sum not exceeding four hundred thousand dollars for the construction and repair of state highways, in accordance with the provisions of the statutes relating to and defining the powers and duties of said commission. Said commission may make contracts during the present calendar year for the whole amount hereby authorized to be expended, but the contracts shall be so made that the amount to be paid from the state treasury during the present calendar year shall not exceed three hundred thousand dollars.

Only citizens to  
be employed.

SECTION 2. No persons except citizens of this Commonwealth shall be employed on the work authorized by this act.

State Highway  
Loan.

SECTION 3. For the purpose of meeting any expenses which may be incurred under the provisions of this act, the treasurer and receiver general is hereby authorized, with the approval of the governor and council, to issue scrip or certificates of indebtedness to an amount not exceeding four hundred thousand dollars, for a term not exceeding thirty years. Said scrip or certificates of indebtedness shall be issued as registered bonds or with interest coupons attached, and shall bear interest not exceeding four per cent. per annum, payable semi-annually on the first day of April and of October in each year. Such scrip or certificates of indebtedness shall be designated on their face as the State Highway Loan, shall be countersigned by the governor, and shall be deemed a pledge of the faith and credit of the Commonwealth; and the principal and interest thereof shall be paid at the times specified therein in gold coin of the United States or its equivalent, and said scrip or certificates of indebtedness shall be sold and disposed of at public auction, or in such other manner, at such times and prices, in such amounts and at such rates of interest, not exceeding the rate above specified, as shall be deemed



best. The sinking fund established by chapter four hundred and ninety-seven of the acts of the year eighteen hundred and ninety-four shall also be maintained for the purpose of providing for the payment of the bonds issued under the authority of this act, and the treasurer and receiver general shall apportion thereto from year to year an amount sufficient with the accumulations of said fund to extinguish at maturity the debt incurred by the issue of said bonds. The amount necessary to meet the annual sinking fund requirements and to pay the interest on said bonds shall be raised by taxation from year to year. Sinking fund.

SECTION 4. This act shall take effect upon its passage.

*Approved June 17, 1898.*

[ACTS OF 1898, CHAPTER 579.]

AN ACT IN ADDITION TO THE SEVERAL ACTS MAKING APPROPRIATIONS FOR EXPENSES AUTHORIZED DURING THE PRESENT YEAR, AND FOR CERTAIN OTHER EXPENSES AUTHORIZED BY LAW.

*Be it enacted, etc., as follows:*

SECTION 1. . . . For the salaries and expenses of the Massachusetts state highway commission, the same to include clerk hire, engineers and expenses incidental and necessary for the performance of their duties, from and after the fourteenth day of June in the present year, as provided for by chapter five hundred and twenty-eight of the acts of the present year, a sum not exceeding fourteen thousand three hundred dollars. . . . Massachusetts  
highway com-  
mission.

SECTION 2. This act shall take effect upon its passage.

*Approved June 23, 1898.*

[RESOLVES OF 1898, CHAPTER 106.]

RESOLVE RELATIVE TO STATE HIGHWAYS IN THE CITIES OF BEVERLY AND GLOUCESTER AND THE TOWNS OF MANCHESTER AND ROCKPORT.

*Resolved,* That the Massachusetts highway commission is hereby authorized and instructed to make a plan show- State highways  
in Beverly,  
Gloucester, etc.

ing the line and grade of the highway passing through the cities of Beverly and Gloucester and the towns of Manchester and Rockport, and known as Hale street, Bridge street, Central street, Union street, Washington street, Summer street, Western avenue and Main street, to Railroad avenue in the town of Rockport.

*Approved June 7, 1898.*

## APPENDIX H.

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### MAINTENANCE.

Owing to the comparatively short sections of State roads built during the first three years' work of the commission, no systematic and economical method was devised for their maintenance. During the past year connection was made between several of the shorter sections, which resulted in fairly long and continuous roads, and a system of continuous repairs has been inaugurated on these long sections, which, it is hoped, will give good results at the minimum cost. One man, with a horse, is employed to look after as long a piece of road as can be properly cared for. This care includes picking off loose stone, filling up any incipient ruts or hollows, spreading binding material when the old material has been displaced, cutting the weeds alongside the roadway, filling any small wash-outs on the shoulders, and in general keeping the road and roadside in good repair.]

Broken stone of two sizes, viz., half-inch screenings and the No. 2, — that which passes a two and one-half inch mesh and stops at a half-inch mesh, — has been stacked in small piles at convenient distances along the sides of the road ; this to be drawn upon as occasion requires.

Under certain conditions of road service and traffic it has been found necessary to use either coarse sand or fine gravel as a " binder," to prevent the fine particles of the broken stone screenings from blowing away, and the consequent working loose of the upper coating of stone. In the main the tendency of the stone to work loose has been confined to a narrow strip between the wheel tracks and in that part of the roadway over which the horses travel. This difficulty has not been on roads where the volume of travel is sufficient to cover a width of 10 to 12 feet, but has been confined to those roads where the travel keeps to one narrow line in the centre of the roadway. A slight sprinkling of the sand or fine gravel, to a width of 6 to 8 feet, has been found to give fairly satisfactory results, and hold the broken stone in place, even through long-continued dry spells.

On the shorter sections of roads the same care is exercised to maintain them ; but the work is performed by local labor, employed at local prices and overseen by the division engineers. The cost of carrying

on the repairs by this last method is somewhat greater than it is by the first, as there is more or less loss of time in starting and finishing and also in the men thus temporarily employed not fully understanding what is required of them. However, the difficulty from this reason is growing less year by year, as the number of experienced men is rapidly increasing.

The table marked "cost of maintenance" shows the cost per mile per year for repairs of all kinds, from the time the work was finished to the end of December, 1898. No attempt has been made to separate the cost of maintenance of the roadway from that of the roadside, although this is being done, from notes in the office. By far the largest part of the maintenance account results from incidental repairs outside of the roadway, such as cleaning gutters, cutting weeds, filling small wash-outs and cleaning catch-basins and waterways.

In some of the roads enumerated in the subjoined table a large part of the cost of repairs resulted from extraordinary rainfalls or unusual floods, which may not be expected to occur except at long intervals of time, and even then with less disastrous results than is indicated by the amounts expended.

No stone-crushing machinery being located in many of the towns traversed by State roads, it has been found necessary to purchase many tons of stone, broken at the time of the building of the road, and stack it at convenient points along the road. The supply of stone thus stacked will not be, in many cases, entirely used for two or three years, and its cost being included in the table increases the amount expended for repairs, and with it the column marked "cost per mile per year."

Taking the 95 towns enumerated in the maintenance table, it will be noted that the average cost per mile per year is about \$108, including the more or less extraordinary items referred to.

*Table showing the Amounts expended for Repairs and Maintenance and the Cost per Mile per Year on Each Road finished previous to 1898.*

| TOWN OR CITY.         | Expended<br>in<br>1896. | Expended<br>in<br>1897. | Expended<br>in<br>1898. | Total.   | Total Cost<br>per Mile<br>per Year. | Remarks.  |
|-----------------------|-------------------------|-------------------------|-------------------------|----------|-------------------------------------|---|
| Acushnet, . . . . .   | -                       | -                       | \$41 44                 | \$41 44  | \$57 55                             |   |
| Adams, . . . . .      | -                       | -                       | 7 63                    | 7 63     | -                                   |   |
| Andover, . . . . .    | \$3 50                  | \$10 57                 | 46 16                   | 60 23    | 27 00                               |   |
| Ashby, . . . . .      | 45 75                   | 78 59                   | 163 79                  | 288 13   | 45 45                               |   |
| Ashfield, . . . . .   | -                       | -                       | 4 65                    | 4 65     | -                                   |   |
| Athol, . . . . .      | -                       | 1,134 39                | 2,664 16                | 3,798 55 | 1,140 09                            | Excessive cost largely due to the reconstruction of retaining wall constructed by the town. |
| Auburn, . . . . .     | -                       | 154 87                  | 134 70                  | 289 57   | 75 61                               |   |
| Barnstable, . . . . . | -                       | -                       | 57 05                   | 57 05    | -                                   |   |
| Barre, . . . . .      | -                       | -                       | 6 47                    | 6 47     | 7 70                                |   |
| Bedford, . . . . .    | -                       | -                       | 7 61                    | 7 61     | -                                   |   |
| Beverly, . . . . .    | -                       | 78 75                   | 182 32                  | 261 07   | 82 62                               | Macadam, 18 feet wide; very heavy travel.   |
| Bourne, . . . . .     | -                       | -                       | 93 92                   | 93 92    | 199 83                              | Includes cost of two catch-basins.  |
| Boxborough, . . . . . | -                       | -                       | 4 29                    | 4 29     | 5 43                                |   |
| Brewster, . . . . .   | -                       | 150 26                  | 500 88                  | 651 14   | 143 42                              | A section of road about 410 feet long washed out by the storm of Nov. 26, 1898.             |
| Brimfield, . . . . .  | -                       | -                       | 7 33                    | 7 33     | -                                   |   |
| Brockton, . . . . .   | -                       | -                       | 24 25                   | 24 25    | -                                   |   |
| Brookfield, . . . . . | -                       | -                       | 1 60                    | 1 60     | -                                   |   |
| Buckland, . . . . .   | -                       | 95 82                   | 21 99                   | 117 81   | 28 94                               | 800 feet macadam, 24 feet wide; 1,400 feet macadam, 18 feet wide.                           |



Table showing the Amounts expended for Repairs and Maintenance, etc. — Continued.

| TOWN OR CITY.               | Expended<br>in<br>1896. | Expended<br>in<br>1897. | Expended<br>in<br>1898. | Total.   | Total Cost<br>per Mile<br>per Year. | Remarks.  |
|-----------------------------|-------------------------|-------------------------|-------------------------|----------|-------------------------------------|---|
| Charlmont, . . . . .        | -                       | -                       | \$51 90                 | \$51 90  | \$126 58                            | Very heavy loads of iron ore pass frequently over this road.                                    |
| Cohasset, . . . . .         | -                       | -                       | 2 61                    | 2 61     | -                                   |   |
| Concord, . . . . .          | -                       | -                       | 7 55                    | 7 55     | 10 49                               |   |
| Cottage City, . . . . .     | \$15 00                 | \$449 15                | 682 73                  | 1,146 88 | 183 81                              | This road is exposed to high winds, which carry off the binder and make its maintenance costly. |
| Dalton, . . . . .           | -                       | 389 71                  | 519 45                  | 889 16   | 276 14                              |   |
| Deerfield, . . . . .        | 105 00                  | 97 57                   | 73 72                   | 276 29   | 76 11                               |   |
| Dennis, . . . . .           | -                       | 251 54                  | 568 13                  | 819 67   | 193 30                              | Includes cost of 260 tons of stone stacked and not yet used.                                    |
| Duxbury, . . . . .          | 178 24                  | 85 06                   | 59 66                   | 322 96   | 82 46                               |   |
| Easthampton, . . . . .      | -                       | 88 14                   | 171 89                  | 260 03   | 73 87                               |   |
| Edgartown, . . . . .        | -                       | -                       | 19 03                   | 19 03    | 57 64                               |   |
| Fairhaven, . . . . .        | -                       | 8 73                    | 97 45                   | 106 18   | 22 37                               |   |
| Fitchburg, . . . . .        | -                       | 33 09                   | 106 73                  | 139 82   | 46 45                               | Repairs to slopes.  |
| Gardner, . . . . .          | -                       | -                       | 77 38                   | 77 38    | 110 54                              |   |
| Gloucester, . . . . .       | 47 00                   | 55 64                   | 137 13                  | 239 77   | 55 25                               |   |
| Goshen, . . . . .           | -                       | 661 41                  | 628 88                  | 1,290 29 | 230 41                              | Mountain road; cost due largely to sliding clay slopes and expense of keeping gutters clear.    |
| Grafton, . . . . .          | -                       | -                       | 10 34                   | 10 34    | 12 16                               |   |
| Granby, . . . . .           | 268 16                  | 121 53                  | 19 62                   | 409 31   | 194 91                              | Due largely to "horse tracks," stone costly.  |
| Great Barrington, . . . . . | -                       | 175 89                  | 382 36                  | 558 25   | 113 93                              |   |
| Hadley, . . . . .           | 581 78                  | 758 21                  | 315 19                  | 1,655 18 | 408 68                              | Excessive cost due to repairs to "horse tracks."  |
| Hancock, . . . . .          | 93 10                   | 58 18                   | 722 89                  | 874 17   | 268 15                              | \$500 expended in gravelling 1895 lay-out; slopes slide badly on 1896 lay-out.                  |

|                                |        |          |          |          |        |  |
|--------------------------------|--------|----------|----------|----------|--------|--|
| Hardwick, . . . . .            | -      | -        | 10 34    | 10 34    | -      |  |
| Hingham, . . . . .             | 108 10 | 112 88   | 101 05   | 322 03   | 52 86  |  |
| Holbrook, . . . . .            | -      | 17 05    | 35 97    | 53 02    | 49 36  |  |
| Holbrook (Weymouth), . . . . . | -      | 52 93    | 14 50    | 67 43    |        |  |
| Holden, . . . . .              | 234 25 | 294 62   | 17 08    | 545 95   | 79 47  | 2,100 feet macadam, 18 feet wide.  |
| Huntington, . . . . .          | -      | 308 56   | 24 07    | 332 63   | 168 00 | Riprap and rough wall constructed where washed by river in spring of 1897.     |
| Lawrence, . . . . .            | -      | -        | 9 65     | 9 65     | 25 40  | Macadam, 18 feet wide.   |
| Lee, . . . . .                 | 10 00  | 56 82    | 418 83   | 485 68   | 84 46  | 750 feet macadam, 24 feet wide.  |
| Lelcester, . . . . .           | 351 46 | 1,090 11 | 2,211 80 | 3,653 37 | 569 92 | Macadam, 24 feet wide, resurfaced with trap rock for about 3,000 feet;         |
| Lexington, . . . . .           | -      | 8 58     | 185 84   | 194 42   | 62 11  | 7,560 feet macadam, 18 feet wide.  |
| Lincoln, . . . . .             | 21 08  | 32 36    | 86 42    | 139 86   | 34 78  | Includes cost of 100 tons of stone stacked.                                    |
| Lowell (North), . . . . .      | -      | -        | 13 44    | 13 44    | 11 40  |  |
| Lowell (South), . . . . .      | -      | -        | 11 36    | 11 36    |        |  |
| Marlon, . . . . .              | -      | 23 51    | 119 31   | 142 82   | 28 17  |  |
| Marlborough, . . . . .         | -      | -        | 7 14     | 7 14     | -      |  |
| Marshfield, . . . . .          | 3 50   | 18 25    | 141 68   | 163 40   | 65 10  |  |
| Mattapoisett, . . . . .        | 3 83   | 6 98     | 68 85    | 79 66    | 21 30  |  |
| Merrimac, . . . . .            | -      | -        | 3 52     | 3 52     | 6 30   |  |
| Methuen, . . . . .             | -      | -        | 44 59    | 44 59    | 36 55  |  |
| Middleborough, . . . . .       | -      | 87 06    | 187 25   | 274 31   | 55 19  |  |
| Monson, . . . . .              | -      | 150 79   | 196 43   | 347 22   | 121 10 | Includes cost of repairs of culvert; damage caused by overflow of mill pond.   |
| Nantucket, . . . . .           | 10 83  | 693 27   | 172 93   | 877 03   | 101 86 | Cost increased by purchase of cargo of stone in 1897; now stacked for repairs. |
| New Braintree, . . . . .       | -      | -        | -        | -        | -      |  |

Table showing the Amounts expended for Repairs and Maintenance, etc. — Continued.

| TOWN OR CITY.                 | Expended<br>in<br>1896. | Expended<br>in<br>1897. | Expended<br>in<br>1898. | Total.   | Total Cost<br>per Mile<br>per Year. | Remarks.   |
|-------------------------------|-------------------------|-------------------------|-------------------------|----------|-------------------------------------|--|
| Newburyport, . . . . .        | -                       | \$6 86                  | \$43 34                 | \$50 20  | \$54 00                             |  |
| Norfolk, . . . . .            | -                       | 22 41                   | 69 66                   | 92 07    | 21 71                               |  |
| Northampton, . . . . .        | \$138 70                | 37 65                   | 77 19                   | 253 54   | 109 76                              | Road is heavily travelled, and stone is soft.  |
| North Adams, . . . . .        | 56 50                   | 52 16                   | 309 87                  | 418 59   | 41 44                               |  |
| North Attleborough, . . . . . | -                       | 65 81                   | 203 82                  | 269 63   | 39 35                               |  |
| Northborough, . . . . .       | -                       | -                       | 6 62                    | 6 62     | 15 77                               |  |
| North Reading, . . . . .      | -                       | -                       | 3 14                    | 3 14     | -                                   |  |
| Norwood, . . . . .            | 27 70                   | 3 68                    | 135 04                  | 166 42   | 58 80                               |  |
| Orange, . . . . .             | -                       | 622 91                  | 74 47                   | 697 38   | 151 80                              | Larger part of expense due to a so-called "cloud burst" in 1897.                           |
| Paxton, . . . . .             | 55 16                   | 729 98                  | 133 38                  | 918 52   | 123 95                              | Includes cost of 70 tons of stone stacked for repairs.                                     |
| Phillipston, . . . . .        | -                       | -                       | 51 90                   | 51 90    | -                                   | Includes cost of 50 tons of stone stacked for repairs.                                     |
| Pittsfield, . . . . .         | 162 62                  | 95 19                   | 228 03                  | 485 84   | 147 22                              |  |
| Plymouth, . . . . .           | 121 60                  | 180 01                  | 502 93                  | 804 54   | 196 72                              |  |
| Princeton, . . . . .          | -                       | -                       | 5 85                    | 5 85     | 10 00                               |  |
| Rehoboth, . . . . .           | -                       | 9 33                    | 74 56                   | 83 89    | 28 90                               |  |
| Revere, . . . . .             | -                       | -                       | 9 19                    | 9 19     | -                                   |  |
| Richmond, . . . . .           | -                       | -                       | 52 77                   | 52 77    | 101 50                              | Gravel.  |
| Russell, . . . . .            | 673 10                  | 529 17                  | 190 96                  | 1,393 23 | 154 97                              |  |
| Sandwich, . . . . .           | -                       | -                       | 317 24                  | 317 24   | 262 18                              | The greater portion of the expense was caused by damage done by storm of Nov. 26-27, 1898. |

|                         |        |        |        |        |        |  |
|-------------------------|--------|--------|--------|--------|--------|--|
| Saltuete, . . . . .     | -      | 46 98  | 172 96 | 219 94 | 105 23 |  |
| Shelburne, . . . . .    | 84 50  | 164 22 | 286 13 | 534 85 | 106 10 | 3,920 feet macadam, 18 feet wide.              |
| Shrewsbury, . . . . .   | -      | 28 48  | 123 09 | 151 57 | 36 35  | 1 mile macadam, 18 feet wide.                  |
| Somerset, . . . . .     | -      | 5 18   | 108 24 | 113 42 | 30 65  | 1,400 feet macadam, 18 feet wide.              |
| South Hadley, . . . . . | -      | 123 75 | 181 97 | 305 72 | 198 50 | 3 carloads of stone stacked for repairs.       |
| Sterling, . . . . .     | -      | -      | 50     | 50     | -      |  |
| Stoneham, . . . . .     | -      | -      | 173 51 | 173 51 | -      |  |
| Sturbridge, . . . . .   | -      | -      | 58 08  | 58 08  | -      | Includes 50 tons of stone stacked for repairs. |
| Sudbury, . . . . .      | -      | -      | 2 61   | 2 61   | -      |  |
| Sunderland, . . . . .   | -      | -      | 1 18   | 1 18   | -      |  |
| Swampscott, . . . . .   | -      | -      | 6 48   | 6 48   | -      |  |
| Taunton, . . . . .      | 235 45 | 372 83 | 145 73 | 754 01 | 298 03 | Stone of poor quality; "horse tracks" badly.   |
| Tisbury, . . . . .      | 18 84  | 208 59 | 225 10 | 452 53 | 68 67  |  |
| Townsend, . . . . .     | -      | 3 92   | 7 07   | 10 99  | 7 18   |  |
| Truro, . . . . .        | -      | 14 22  | 14 86  | 29 08  | 14 20  |  |
| Tyngsborough, . . . . . | -      | 48 91  | 184 58 | 233 49 | 53 55  |  |
| Walpole, . . . . .      | 16 00  | 29 70  | 277 95 | 323 65 | 58 21  |  |
| Ware, . . . . .         | -      | -      | 6 33   | 6 33   | -      |  |
| Wareham, . . . . .      | -      | 8 43   | 19 93  | 28 35  | 22 16  |  |
| Warren, . . . . .       | -      | 6 15   | 75 71  | 81 86  | 55 69  |  |
| Watertown, . . . . .    | -      | 73 49  | 169 91 | 243 40 | 125 46 | Macadam, 33 feet wide.                         |
| Wayland, . . . . .      | -      | -      | 3 80   | 3 80   | -      |  |
| Wenham, . . . . .       | -      | -      | 27 68  | 27 68  | 43 25  |  |

Table showing the Amounts expended for Repairs and Maintenance, etc. — Concluded.

| TOWN OR CITY.                 | Expended<br>in<br>1896. | Expended<br>in<br>1897. | Expended<br>in<br>1898. | Total.      | Total Cost<br>per Mile<br>per Year. | Remarks.  |
|-------------------------------|-------------------------|-------------------------|-------------------------|-------------|-------------------------------------|---|
| Westborough, . . . . .        | -                       | -                       | \$4 49                  | \$4 49      | -                                   |   |
| Westfield, . . . . .          | \$980 38                | \$11 08                 | 55 37                   | 1,046 83    | \$162 95                            | Macadam, 18 feet wide; macadam washed out at Frog Hollow and macadam relaid near county bridge in 1896. |
| Westminster, . . . . .        | 7 50                    | 50 49                   | 287 19                  | 345 18      | 90 13                               |   |
| West Newbury, . . . . .       | -                       | 355 52                  | 460 95                  | 816 47      | 211 52                              | Includes 100 tons of stone stacked; slopes slide badly on Pipe Stone Hill.                              |
| Westport, . . . . .           | -                       | 132 96                  | 132 45                  | 265 41      | 34 42                               | Macadam, 18 feet wide.  |
| West Springfield, . . . . .   | -                       | 171 66                  | 198 84                  | 370 50      | 148 20                              | Macadam, 18 feet wide.  |
| West Tisbury, . . . . .       | -                       | 90 87                   | 123 11                  | 213 98      | 47 50                               | Macadam, 15 feet, 12 feet and 10 feet wide.   |
| Weymouth, . . . . .           | -                       | 212 47                  | 108 57                  | 321 04      | 133 75                              |   |
| Whitman, . . . . .            | -                       | 43 72                   | 104 26                  | 147 98      | 31 60                               | Macadam, 18 feet wide.  |
| Wilbraham, . . . . .          | -                       | 222 10                  | 337 18                  | 559 28      | 154 92                              | Repairs are expensive, on account of "horse tracks."  |
| Williamsburg, . . . . .       | -                       | 3 49                    | 58 97                   | 62 46       | 83 30                               |   |
| Williamstown, . . . . .       | -                       | 20 42                   | 148 09                  | 168 51      | 79 11                               |   |
| Windsor, . . . . .            | -                       | -                       | 1 79                    | 1 79        | -                                   |   |
| Worcester (Paxton), . . . . . | -                       | 21 02                   | 385 94                  | 406 96      | 210 80                              |   |
| Wrentham, . . . . .           | 68 50                   | 63 76                   | 162 13                  | 294 39      | 49 40                               | Freshet washed gutters badly.   |
| Yarmouth (North), . . . . .   | -                       | 108 44                  | 340 45                  | 448 89      | 53 12                               |   |
| Yarmouth (South), . . . . .   | -                       | 398 05                  | 280 52                  | 678 57      | 83 67                               |   |
| Totals, . . . . .             | \$4,727 19              | \$13,266 93             | \$20,661 16             | \$38,655 28 | -                                   |   |



# APPENDIX K.

The following table shows the work done in 1898. The column headed "Total value of work done" includes the amounts already paid and the amounts held in reserve, the miscellaneous items of cost pertaining to the work, and the cost of inspection and engineering.

| CITY—TOWN.                    | Lay-out. | No. of Contract. | Date of Last Payment. | Total Value of Work Done. | EXCAVATION AND BORROW. |          | LEDGE EXCAVATION. |          | CULVERTS.       |                     | BRIDGES. |                         |                       | GRAVEL.  |              | TELEFORD. |               | SHAPING FOR BROKEN STONE AND GRAVEL SURFACING. |               | BROKEN STONE AND GRAVEL FOR SURFACING. |                                      |                       | GUARD RAIL.         |              | SIDE DRAINS. |         | STONE BOUNDS. |          | Miscellaneous Items of Construction, Cost. | Engineering and Inspection, Cost. |        |    |
|-------------------------------|----------|------------------|-----------------------|---------------------------|------------------------|----------|-------------------|----------|-----------------|---------------------|----------|-------------------------|-----------------------|----------|--------------|-----------|---------------|--|---------------|--|--------------------------------------|-----------------------|---------------------|--------------|--------------|---------|---------------|----------|--|-----------------------------------|--------|----|
|                               |          |                  |                       |                           | Cubic Yards.           | Cost.    | Cubic Yards.      | Cost.    | No.             | Cost.               | No.      | Cost Masonry.           | Cost Super-structure. | Total.   | Cubic Yards. | Cost.     | Square Yards. | Cost.  | Square Yards. | Tons.                                  | Cost, including Payments to Weigher. | Linear Feet.          | Cost.               | Linear Feet. | Cost.        | No.     | Cost.         |          |  |                                   |        |    |
| 1 Acushnet,                   | 1897     | 186              | December, 1898        | \$6 19                    | -                      | -        | -                 | -        | -               | -                   | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | -                   | -            | -            | 2       | \$5 70        | -        | \$0 49                                     | 1                                 |        |    |
| 2 Adams,                      | 1897     | 245              | November, 1898        | 1,717 61                  | 269                    | \$80 82  | -                 | -        | -               | \$5 00              | 1        | -                       | \$500 00              | \$500 00 | 46           | \$23 00   | -             | -  | 1,517         | \$30 34                                | 1,056                                | 387.59                | \$755 80            | 72.0         | \$10 08      | -       | -             | 3        | 3 75                                       | \$49 05                           | 259 80 | 2  |
| 3 Andover,                    | 1897     | 187              | November, 1898        | 675 26                    | 258                    | 77 40    | -                 | -        | 2               | 62 97               | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | 1.00                  | 1 70                | 2,973.8      | 446 07       | -       | -             | -        | -  | 12 00                             | 75 12  | 3  |
| 4 Ashby,                      | 1896     | 109              | September, 1898       | 1 08                      | -                      | -        | -                 | -        | -               | -                   | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | -                   | -            | -            | -       | -             | -        | 1 00                                       | 08                                | 1      |    |
| 5 Ashby, <sup>1</sup>         | 1898     | 303              | December, 1898        | 4,052 89                  | 3,503                  | 1,050 90 | 309.68            | \$541 94 | 2               | 155 40              | -        | -                       | -                     | -        | 110          | 55 00     | -             | -  | 3,200         | 61 00                                  | 2,640                                | 752.91                | 1,130 72            | -            | -            | 1,352.0 | \$405 60      | 10       | 26 30                                      | 8 07                              | 614 96 | 5  |
| 6 Ashfield, <sup>2</sup>      | 1897     | 268              | November, 1898        | 9,025 30                  | 10,698                 | 2,450 20 | 1,481.60          | 2,592 79 | 10              | 2,003 70            | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | -                   | 3,230.0      | 581 40       | 46      | 116 60        | 34 20    | 1,216 41                                   | 6                                 |        |    |
| 7 Ashfield, <sup>2</sup>      | 1898     | 296              | December, 1898        | 10,711 44                 | 10,500                 | 2,981 87 | 2,611.67          | 2,611 67 | 14              | 2,391 17            | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | 1,993.3             | 299 00       | 36           | 118 28  | 402 30        | 1,306 55 | 7  |                                   |        |    |
| 8 Ashfield, <sup>1,2</sup>    | 1898     | 304              | December, 1898        | 5,629 03                  | 3,000                  | 681 00   | 312.70            | 250 16   | 1               | 92 00               | 1        | \$3,881 25 <sup>3</sup> | -                     | 3,881 25 | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | -                   | -            | 200.0        | 60 00   | -             | 11 34    | -  | 650 28                            | 8      |    |
| 9 Auburn,                     | 1896     | 148              | November, 1898        | 12 77                     | -                      | -        | -                 | -        | 1               | 11 75               | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | -                   | -            | -            | -       | -             | -        | -  | 1 02                              | 9      |    |
| 10 Auburn, <sup>1</sup>       | 1898     | 333              | December, 1898        | 3,998 58                  | 1,306                  | 457 28   | 2.50              | 1 38     | 5               | 211 21              | -        | -                       | -                     | -        | 275          | 137 50    | -             | -  | 4,156         | 83 12                                  | 2,112                                | 1,270.98              | 2,224 22            | -            | -            | 1,152.0 | 403 20        | 5        | 20 50                                      | -                                 | 457 17 | 10 |
| 11 Barnstable,                | 1897     | 243              | July, 1898            | 6,057 04                  | 460                    | 115 00   | -                 | -        | 16 <sup>3</sup> | 963 86              | -        | -                       | -                     | -        | 300          | 150 00    | -             | -  | 10,678        | 213 56                                 | 7,850                                | 2,220.93              | 3,815 30            | -            | -            | -       | -             | 10       | 28 90                                      | 77 18                             | 693 21 | 11 |
| 12 Barre,                     | 1897     | 246              | June, 1898            | 101 57                    | -                      | -        | -                 | -        | -               | -                   | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | 47.40                 | 69 85               | -            | -            | -       | -             | -        | 15 56                                      | 16 16                             | 12     |    |
| 13 Bedford,                   | 1897     | 233              | June, 1898            | 800 03                    | 62                     | 15 50    | 6.50              | 6 50     | -               | 4 50                | -        | -                       | -                     | -        | -            | -         | -             | -  | 1,748         | 34 96                                  | 210                                  | 71.62                 | 107 43              | 520.0        | 104 00       | 782.0   | 351 90        | -        | 23 83                                      | 151 41                            | 13     |    |
| 14 Beverly,                   | 1897     | 271              | May, 1898             | 710 70                    | 41                     | 18 45    | -                 | -        | -               | -                   | -        | -                       | -                     | -        | 26           | 13 00     | -             | -  | 1,066         | 21 32                                  | 650                                  | 251.92                | 503 84              | -            | -            | -       | 6             | 13 80    | -  | 140 29                            | 14     |    |
| 15 Beverly,                   | 1898     | 316              | November, 1898        | 5,748 68                  | 559                    | 223 60   | -                 | -        | 6               | 473 69              | -        | -                       | -                     | -        | 875          | 437 50    | -             | -  | 8,400         | 168 00                                 | 6,800                                | 1,895.32              | 3,471 57            | -            | -            | 909.5   | 318 33        | 11       | 35 98                                      | -                                 | 620 01 | 15 |
| 16 Bourne,                    | 1897     | 234              | September, 1898       | 67 24                     | -                      | -        | -                 | -        | -               | 13 50               | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | -                   | -            | -            | -       | -             | -        | 41 01                                      | 12 73                             | 16     |    |
| 17 Bourne, <sup>1</sup>       | 1898     | 323              | December, 1898        | 4,601 30                  | 2,201                  | 660 33   | 3.33              | 5 84     | 2               | 127 17              | -        | -                       | -                     | -        | 198          | 148 76    | -             | -  | 6,489         | 129 78                                 | 5,600                                | 1,724.90              | 2,890 72            | -            | -            | -       | -             | 23       | 71 89                                      | -                                 | 666 81 | 17 |
| 18 Boxborough,                | 1897     | 227              | June, 1898            | 369 90                    | 440                    | 132 09   | -                 | -        | -               | -                   | -        | -                       | -                     | -        | 66           | 32 80     | -             | -  | -             | -                                      | -                                    | 60.97                 | 82 31               | -            | -            | -       | -             | -        | 26 71                                      | 95 99                             | 18     |    |
| 19 Brewster,                  | 1897     | 181              | October, 1897         | 7 53                      | -                      | -        | -                 | -        | -               | -                   | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | -                   | -            | -            | -       | -             | -        | -  | 7 53                              | 19     |    |
| 20 Brimfield, <sup>4</sup>    | 1897     | 262              | November, 1898        | 3,512 45                  | 866                    | 259 80   | 135.00            | 236 25   | 7               | 303 85              | 1        | 113 60 <sup>4</sup>     | 125 00                | 238 60   | -            | -         | -             | -  | -             | -                                      | 10,250                               | 2,057.00 <sup>5</sup> | 1,645 60            | 1,352.0      | 202 80       | -       | -             | 17 50    | 608 05                                     | 20                                |        |    |
| 21 Brockton,                  | 1897     | 216              | November, 1898        | 768 82                    | 196                    | 83 00    | .50               | 87       | -               | -                   | -        | -                       | -                     | -        | -            | -         | -             | -  | 2,489         | 49 77                                  | 1,636                                | 486.90 <sup>5</sup>   | 529 25              | -            | -            | -       | 2             | 3 00     | -  | 102 93                            | 21     |    |
| 22 Brockton, <sup>1</sup>     | 1898     | 317              | December, 1898        | 3,338 14                  | 2,402                  | 1,004 80 | 1.50              | 2 62     | 1               | 47 39               | -        | -                       | -                     | -        | -            | -         | -             | -  | 5,304         | 106 08                                 | 3,307                                | 1,451.43 <sup>5</sup> | 1,711 14            | -            | -            | -       | -             | -        | 6 30                                       | 4 58                              | 455 23 | 22 |
| 23 Brookfield,                | 1897     | 259              | December, 1898        | 2,891 35                  | 1,588                  | 575 99   | 1.50              | 2 63     | 3               | 99 48               | -        | -                       | -                     | -        | 91           | 45 55     | 95            | \$33 25  | 3,900         | 78 00                                  | 2,000                                | 906.33                | 1,495 45            | 267.7        | 40 15        | 285.0   | 85 35         | 13       | 16 90                                      | 25 31                             | 393 29 | 23 |
| 24 Brookfield, <sup>1,4</sup> | 1898     | 307              | December, 1898        | 2,607 83                  | 2,613                  | 1,030 37 | -                 | -        | -               | -                   | 1        | 1,035 10                | 47 62                 | 1,082 72 | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | -                   | -            | -            | -       | -             | -        | 5 32                                       | -                                 | 489 42 | 21 |
| 25 Buckland, <sup>1</sup>     | 1898     | 308              | December, 1898        | 5,975 02                  | 1,850                  | 555 00   | 47.00             | 82 25    | 1               | 31 95               | 2        | 2,181 00 <sup>4</sup>   | -                     | 2,181 00 | 730          | 365 00    | -             | -  | 3,368         | 67 35                                  | 2,000                                | 755.00                | 1,472 25            | -            | -            | 1,114.0 | 415 60        | 12       | 30 60                                      | -                                 | 711 02 | 25 |
| 26 Charlemont,                | 1897     | 247              | October, 1898         | 204 49                    | 61                     | 18 30    | -                 | -        | -               | -                   | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | 20.00                 | 41 00               | 60.5         | 9 08         | 282.0   | 98 70         | -        | -  | 13 96                             | 23 45  | 26 |
| 27 Charlemont, <sup>1</sup>   | 1898     | 299              | October, 1898         | 3,324 62                  | 1,600                  | 480 00   | 6.00              | 10 50    | -               | 589 48 <sup>1</sup> | -        | -                       | -                     | -        | -            | -         | -             | -  | 2,900         | 58 00                                  | 2,525                                | 787.00                | 1,540 95            | 225.0        | 33 75        | 185.0   | 61 75         | 14       | 49 60                                      | 55 50                             | 451 09 | 27 |
| 28 Chicopee, <sup>1</sup>     | 1898     | 352              | December, 1898        | 524 48                    | -                      | -        | -                 | -        | -               | -                   | -        | -                       | -                     | -        | -            | -         | -             | -  | -             | -                                      | -                                    | -                     | -                   | -            | -            | 1,075.5 | 430 20        | -        | -  | 94 28                             | 28     |    |
| 29 Cobasset,                  | 1897     | 260              | June, 1898            | 664 82                    | 538                    | 212 10   | 2.70              | 4 72     | -               | -                   | -        | -                       | -                     | -        | 1            | 75        | -             | -  | 1,667         | 33 34                                  | -                                    | 1,487.21 <sup>5</sup> | 163 31 <sup>4</sup> | 637.8        | 95 67        | -       | 2             | 2 60     | 4 79                                       | 117 51                            | 29     |    |
| 30 Colrain, <sup>1,4</sup>    | 1898     | 318              | December, 1898        | 3,038 11                  | 1,698                  | 562 78   | 133.19            | 266 38   | 10              | 825 45              | -        | -                       | -                     | -        | -            | -         | -             | -  | 6,026         | 120 62                                 | 3,000                                | 471.33                | 471 33              |              |              |         |               |          |  |                                   |        |    |

<sup>1</sup> Roads on which work is yet to be done.

<sup>2</sup> Graded roads.

<sup>3</sup>





APPENDIX K.—Table showing Work done in 1898, and its Cost—Continued

|    | CITY—TOWN.                       | Lay-out. | No.<br>of Contract. | Date<br>of<br>Last Payment. | Total<br>Value of Work<br>Done. | EXCAVATION AND<br>BORROW. |             | LEDGE EXCAVATION. |             | CULVERTS. |             | BRIDGES. |                  |                              | GRAVEL.     |              | TELFORD.   |                  | SHAPING FOR<br>BROKEN STONE AND<br>GRAVEL SURFACING. |                  | BROKEN STONE AND GRAVEL FOR<br>SURFACING. |                  |                           | GUARD RAIL.                                |                 | SIDE DRAINS. |                 | STONE BOUNDS. |         | Miscellaneous<br>Items of<br>Construction,<br>Cost. | Engineering<br>and<br>Inspection,<br>Cost. |                |
|----|----------------------------------|----------|---------------------|-----------------------------|---------------------------------|---------------------------|-------------|-------------------|-------------|-----------|-------------|----------|------------------|------------------------------|-------------|--------------|------------|------------------|--|------------------|---|------------------|---------------------------|--|-----------------|--------------|-----------------|---------------|---------|---|--|----------------|
|    |                                  |          |                     |                             |                                 | Cubic Yards.              | Cost.       | Cubic Yards.      | Cost.       | No.       | Cost.       | No.      | Cost<br>Masonry. | Cost<br>Super-<br>structure. | Total.      | Cubic Yards. | Cost.      | Square<br>Yards. | Cost.  | Square<br>Yards. | Cost.                                     | Square<br>Yards. | Tons.                     | Cost, including<br>Payments to<br>Weigher. | Linear<br>Feet. | Cost.        | Linear<br>Feet. | Cost.         | No.     |   |  | Cost.          |
|    | Brought forward,                 |          |                     |                             | \$126,755 28                    | 72,929                    | \$21,879 41 | 8,611.37          | \$11,186 20 | 113       | \$11,501 91 | 9        | \$9,019 84       | \$1,537 83                   | \$10,557 67 | 3,257        | \$1,535 92 | 95               | \$33 25  | 111,918          | \$2,238 35                                | 85,249           | { 25,572.13<br>3,544.21 } | \$40,974 33                                | 18,505.0        | \$3,102 01   | 11,086.0        | \$4,041 73    | 389     | \$1,185 87  | \$1,771 95                                 | \$16,740 65    |
| 1  | Grafton,                         | 1897     | 225                 | June, 1898                  | 9 25                            | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | -  |                |
| 2  | Great Barrington, <sup>2</sup>   | 1897     | 255                 | October, 1898               | 14,138 57                       | 13,379                    | 4,013 82    | 3,626.33          | 6,346 08    | 5         | 424 05      | -        | -                | -                            | -           | 365          | 237 25     | -                | -  | -                | -   | 4,900            | 911.00                    | 592 15                                     | 2,817.3         | 122 60       | 394.0           | 137 90        | 8       | 12 00   | 8 50<br>68 90                              | 75<br>1,833 82 |
| 3  | Hancock,                         | 1895     | 97                  | August, 1898                | 523 57                          | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | 3,950            | 822.00                    | 481 60                                     | -               | -            | -               | -             | -       | -   | 41 97                                      |                |
| 4  | Hancock, <sup>2</sup>            | 1896     | 199                 | - 1898                      | 21 51                           | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | 21 54                                      |                |
| 5  | Hancock, <sup>2</sup>            | 1898     | 298                 | October, 1898               | 4,124 21                        | 2,997                     | 875 93      | 134.00            | 293 19      | 5         | 514 54      | -        | -                | -                            | -           | 101          | 231 29     | -                | -  | -                | -   | 4,850            | 1,010.00                  | 585 83                                     | 534.7           | 80 21        | 2,837.0         | 624 14        | 10      | 27 63   | -  | 577 50         |
| 6  | Hadley,                          | 1898     | 336                 | December, 1898              | 5,252 42                        | 1,767                     | 997 20      | -                 | -           | 1         | 24 73       | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | 4,050            | 1,469.03                  | 3,231 87                                   | -               | -            | 700.0           | 350 00        | 13      | 37 59   | 275 95                                     | 577 50         |
| 7  | Hardwick, etc., <sup>4</sup>     | 1897     | 263                 | November, 1898              | 6,623 76                        | 1,890                     | 615 85      | 53.61             | 107 22      | 10        | 503 51      | -        | -                | -                            | -           | 1            | 50         | -                | -  | -                | -   | 7,920            | 2,797.95                  | 3,917 13                                   | 655.2           | 98 28        | 278.0           | 111 20        | 8       | 12 00   | 71 46                                      | 982 41         |
| 8  | Hingham,                         | 1897     | 228                 | January, 1898               | 95 87                           | 81                        | 28 32       | 20.50             | 35 87       | 1         | 24 00       | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | 7 68                                       |                |
| 9  | Holbrook,                        | 1896     | 173                 | July, 1898                  | 5 80                            | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | 46 9                                       |                |
| 10 | Holbrook (Weymouth),             | 1894-96  | 286                 | October, 1898               | 6,361 51                        | 1,110                     | 332 98      | 27.20             | 68 00       | 5         | 159 80      | -        | -                | -                            | -           | 545          | 190 62     | -                | -  | -                | -   | 16,482           | 329 65                    | 9,700                                      | 3,546.30        | 4,214 27     | -               | 39 45         | 767.0   | 268 45  | -  | 5 34           |
| 11 | Holden,                          | 1897     | 189                 | January, 1898               | 112 84                          | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | 729 23                                     |                |
| 12 | Holden,                          | 1898     | 300                 | December, 1898              | 5,423 00                        | 1,428                     | 499 84      | 38.30             | 67 03       | 6         | 532 38      | -        | -                | -                            | -           | 742          | 482 30     | 1,522            | 456 48   | 5,621            | 112 12                                    | 4,050            | 1,220.56                  | 1,750 97                                   | 692.0           | 103 80       | -               | -             | -       | -   | 9 04                                       |                |
| 13 | Huntington,                      | 1896     | 127                 | May, 1898                   | 32 82                           | -                         | -           | -                 | -           | -         | 4 50        | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | 410.4           | 61 56        | 2,372.0         | 830 20        | 10      | 25 50   | 19 43                                      | 584 08         |
|    |                                  |          |                     |                             |                                 |                           |             |                   |             |           |             |          |                  |                              |             |              |            |                  |  |                  |   |                  |                           | 111.3                                      | 25 69           | -            | -               | -             | -       | -   | 2 63                                       |                |
| 14 | Leicester,                       | 1896     | 119                 | January, 1898               | 568 58                          | 177                       | 62 19       | 1.00              | 1 75        | 3         | 328 00      | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | 217.0           | 39 06        | 35.0            | 8 75          | -       | -   | 84 20                                      | 44 63          |
| 15 | Leicester, <sup>2</sup>          | 1898     | 293                 | December, 1898              | 17,119 89                       | 6,011                     | 2,114 25    | 15.39             | 26 93       | 9         | 963 39      | -        | -                | -                            | -           | 17           | 20 09      | -                | -  | -                | -   | 13,696           | 273 92                    | 12,850                                     | 7,937.36        | 8,817 95     | 1,172.9         | 175 91        | 6,718.0 | 2,397 82  | 41   | 138 01         |
| 16 | Lexington,                       | 1898     | 285                 | November, 1898              | 14,874 86                       | 4,127                     | 1,527 37    | 910.13            | 1,592 73    | 8         | 1,268 07    | -        | -                | -                            | -           | 488          | 292 71     | -                | -  | -                | -   | 16,863           | 337 25                    | 11,800                                     | 4,256.25        | 6,275 69     | 3,581.0         | 537 60        | 3,154.0 | 1,103 90  | 30   | 79 12          |
| 17 | Lincoln,                         | 1897     | 190                 | May, 1898                   | 146 92                          | -                         | -           | -                 | -           | 1         | 39 30       | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | 639.0           | 95 85        | -               | -             | -       | -   | -  | 163 93         |
| 18 | Lowell (North),                  | 1897     | 211                 | -                           | 3 49                            | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | 14 77                                      |                |
| 19 | Lowell (South),                  | 1897     | 219                 | August, 1898                | 363 15                          | 120                       | 43 93       | -                 | -           | -         | 13 50       | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | 200              | 85.95                     | 171 90                                     | -               | -            | -               | -             | -       | -   | 3 49                                       |                |
| 20 | Lowell (South),                  | 1898     | 291                 | November, 1898              | 6,044 07                        | 283                       | 113 16      | 6.50              | 13 00       | 1         | 268 41      | -        | -                | -                            | -           | 1,741        | 1,133 60   | -                | -  | -                | -   | 7,714            | 154 29                    | 5,500                                      | 1,785.09        | 3,302 42     | -               | -             | -       | -   | 1 86                                       |                |
| 21 | Lunenburg,                       | 1898     | 310                 | December, 1898              | 4,377 70                        | 1,704                     | 468 62      | 24.00             | 8 38        | 3         | 222 10      | 1        | 807 00           | 226 09                       | 1,033 09    | 129          | 70 95      | -                | -  | -                | -   | 5,308            | 106 16                    | 3,780                                      | 1,179.91        | 1,812 27     | 497.0           | 74 55         | 495.0   | 173 25  | 11   | 45 75          |
|    |                                  |          |                     |                             |                                 |                           |             |                   |             |           |             |          |                  |                              |             |              |            |                  |  |                  |   |                  |                           |  |                 |              |                 |               |         |   | 3 17                                       | 540 81         |
| 22 | Marion,                          | 1895     | 67                  | -                           | 259 23                          | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | -  | 20 78          |
| 23 | Marlborough (East),              | 1897     | 256                 | November, 1898              | 3,116 09                        | 1,005                     | 315 18      | 134.26            | 234 95      | 3         | 224 91      | -        | -                | -                            | -           | 70           | 42 00      | -                | -  | -                | -   | 5,000            | 100 00                    | 3,520                                      | 1,232.63        | 1,731 05     | 91.6            | 13 74         | 356.0   | 124 60  | -  | 238 45         |
| 24 | Marlborough (West),              | 1897     | 272                 | September, 1898             | 6,448 51                        | 2,224                     | 833 17      | 301.40            | 527 45      | 4         | 332 09      | -        | -                | -                            | -           | 573          | 313 80     | -                | -  | -                | -   | 9,030            | 180 60                    | 6,420                                      | 2,165.16        | 3,002 97     | -               | -             | 786.0   | 275 10  | 2  | 3 00           |
| 25 | Marshfield, <sup>2</sup>         | 1898     | 320                 | December, 1898              | 2,904 29                        | 2,115                     | 724 50      | .50               | 87          | 1         | 191 31      | -        | -                | -                            | -           | 29           | 14 50      | -                | -  | -                | -   | 3,078            | 61 57                     | 2,640                                      | 895.66          | 1,413 02     | -               | -             | -       | -   | -  | 159 92         |
| 26 | Mattapoisett,                    | 1895     | 76                  | -                           | 7 83                            | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | -  | 469 72         |
| 27 | Merrimac,                        | 1897     | 248                 | July, 1898                  | 850 80                          | 450                       | 251 64      | -                 | -           | 3         | 36 26       | -        | -                | -                            | -           | 256          | 128 00     | -                | -  | -                | -   | -                | -                         | -  | 67.92           | 112 07       | -               | -             | -       | -   | -  | 63 26          |
| 28 | Merrimac,                        | 1898     | 346                 | -                           | 65 25                           | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | 231 12                                     |                |
| 29 | Middleborough,                   | 1897     | 221                 | December, 1898              | 268 71                          | 105                       | 31 50       | -                 | -           | -         | -           | -        | -                | -                            | -           | 3            | 1 65       | -                | -  | -                | -   | 505              | 10 10                     | 350  | 132.21          | 175 62       | -               | -             | -       | -   | -  | 65 25          |
| 30 | Middleborough,                   | 1898     | 321                 | December, 1898              | 3,027 97                        | 1,409                     | 422 73      | 4.00              | 7 00        | -         | -           | -        | -                | -                            | -           | 30           | 18 00      | -                | -  | -                | -   | 5,298            | 105 90                    | 3,780                                      | 1,344.70        | 1,841 69     | -               | -             | -       | -   | -  | 15 97          |
| 31 | Nantague,                        | 1898     | 297                 | December, 1898              | 8,083 20                        | 2,723                     | 933 19      | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | 13,533           | 270 66                    | 9,600                                      | 3,254.56        | 5,927 20     | -               | -             | -       | -   | -  | 219 48         |
|    |                                  |          |                     |                             |                                 |                           |             |                   |             |           |             |          |                  |                              |             |              |            |                  |  |                  |   |                  |                           |  |                 |              |                 |               |         |   | 21 75                                      | 881 90         |
| 32 | Nantucket,                       | 1895     | 107                 | January, 1898               | 735 57                          | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | 236.60          | 709 80       | -               | -             | -       | -   | -  | 25 77          |
| 33 | Nantucket (No. 2),               | 1896     | 175                 | -                           | 13 15                           | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | -  | 1 05           |
| 34 | Nantucket,                       | 1896-97  | 275                 | June, 1898                  | 5,887 31                        | 1,875                     | 375 00      | -                 | -           | -         | -           | -        | -                | -                            | -           | 1,007        | 1,762 95   | -                | -  | -                | -   | 9,000            | 180 00                    | 6,000                                      | 1,323.57        | 2,739 13     | -               | -             | -       | -   | -  | 807 22         |
| 35 | Newburyport, <sup>2</sup>        | 1898     | 342                 | December, 1898              | 2,956 98                        | 1,249                     | 212 33      | -                 | -           | 3         | 593 75      | -        | -                | -                            | -           | 265          | 76 85      | -                | -  | -                | -   | 8,472            | 84 72                     | 4,220                                      | 1,521.66        | 1,553 66     | -               | -             | -       | -   | -  | 393 99         |
| 36 | Norfolk, <sup>1</sup>            | 1895     | 264                 | May, 1898                   | 319 43                          | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | 1,466            | 29 32                     | 350  | 159.73          | 231 50       | -               | -             | -       | -   | -  | 58 61          |
| 37 | Northampton,                     | 1897     | 212                 | December, 1898              | 47 88                           | -                         | -           | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | -  | 3 84           |
| 38 | Northampton, <sup>2</sup>        | 1898     | 337                 | December, 1898              | 3,237 30                        | 4,934                     | 1,960 10    | -                 | -           | 4         | 409 10      | -        | -                | -                            | -           | 41           | 26 40      | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | -  | 4 57           |
| 39 | North Attleborough, <sup>2</sup> | 1896     | 157                 | January, 1898               | 453 79                          | 712                       | 284 76      | -                 | -           | -         | 1 40        | -        | -                | -                            | -           | 50           | 37 50      | -                | -  | -                | -   | -                | -                         | 600  | 125.00          | 93 75        | -               | -             | 1,086.0 | 380 10  | 8  | 29 76          |
| 40 | North Attleborough, <sup>2</sup> | 1897     | 219                 | December, 1898              | 1,857 89                        | 330                       | 134 01      | 215.70            | 405 41      | 2         | 214 60      | -        | -                | -                            | -           | 75           | 78 75      | -                | -  | -                | -   | -                | -                         | 3,830                                      | 438.00          | 197 10       | 1,060.0         | 212 00        | 728.0   | 236 45  | 6  | 11 31          |
| 41 | Northborough,                    | 1897     | 261                 | October, 1898               | 3,911 31                        | 879                       | 294 62      | 38.00             | 66 50       | 2         | 464 80      | -        | -                | -                            | -           | 122          | 73 38      | -                | -  | -                | -   | 6,592            | 131 81                    | 4,750                                      | 1,470.47        | 1,913 09     | -               | -             | 406.0   | 343 76  | 25   | 47 36          |
| 42 | Northborough, <sup>2</sup>       | 1898     | 331                 | December, 1898              | 1,281 25                        | 2,666                     | 1,066 48    | 8.10              | 8 10        | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | 33 95                                      |                |
| 43 | North Reading,                   | 1897     | 191                 | May, 1898                   | 533 62                          | 559                       | 167 70      | -                 | -           | -         | -           | -        | -                | -                            | -           | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -       | -   | 512 01                                     |                |
| 44 | Norwood,                         | 1897     | 250                 | May, 1898                   | 472 89                          | 334                       | 100 91      | 11.00             | 19 24       | -         | 26 32       | -        | -                | -                            | -           | 8            | 4 80       | -                | -  | -                | -   | -                | -                         | -  | 5.00            | 8 75         | 1,822.0         | 273 30        | -       | -   | 2 10                                       | 72 77          |
|    |                                  |          |                     |                             |                                 |                           |             |                   |             |           |             |          |                  |                              |             |              |            |                  |  |                  |   |                  |                           |  |                 |              |                 |               |         |   | 9 00                                       | 72 77          |
|    |                                  |          |                     |                             |                                 |                           |             |                   |             |           |             |          |                  |                              |             |              |            |                  |  |                  |   |                  |                           |  |                 |              |                 |               |         |   | 106 49                                     | 48 91          |
| 45 | Paxton (No. 1),                  | 1895     | 41                  | March, 1898                 | 4 89                            | -                         | -           | -                 | -           | -         |             |          |                  |                              |             |              |            |                  |  |                  |   |                  |                           |  |                 |              |                 |               |         |   |  |                |





APPENDIX K.—Table showing Work done in 1898, and its Cost—Continued.

| CITY—TOWN.       | Lay-out.                        | No.<br>of Con-<br>tract. | Date<br>of<br>Last Payment. | Total<br>Value of Work<br>Done. | EXCAVATION AND<br>BORROW. |             | LEDGE EXCAVATION. |             | CULVERTS. |                | BRIDGES. |                  |                              | GRAVEL.            |              | TELFORD.   |                  | SHAPING FOR<br>BROKEN STONE AND<br>GRAVEL SURFACING. |                  | BROKEN STONE AND GRAVEL FOR<br>SURFACING. |                  |                           | GUARD RAIL.                                |                 | SIDE DRAINS. |                 | STONE BOUNDS. |     | Miscellaneous<br>Items of<br>Construction,<br>Cost. | Engineering<br>and<br>Inspection,<br>Cost. |             |
|------------------|---------------------------------|--------------------------|-----------------------------|---------------------------------|---------------------------|-------------|-------------------|-------------|-----------|----------------|----------|------------------|------------------------------|--------------------|--------------|------------|------------------|--|------------------|---|------------------|---------------------------|--|-----------------|--------------|-----------------|---------------|-----|---|--|-------------|
|                  |                                 |                          |                             |                                 | Cubic Yards.              | Cost.       | Cubic Yards.      | Cost.       | No.       | Cost.          | No.      | Cost<br>Masonry. | Cost<br>Super-<br>structure. | Total.             | Cubic Yards. | Cost.      | Square<br>Yards. | Cost.  | Square<br>Yards. | Cost.                                     | Square<br>Yards. | Tons.                     | Cost, including<br>Payments to<br>Weigher. | Linear<br>Feet. | Cost.        | Linear<br>Feet. | Cost.         | No. | Cost.   |  |             |
| Brought forward, |                                 |                          |                             | \$265,299 56                    | 133,058                   | \$42,107 60 | 14,225.69         | \$21,046 10 | 203       | \$20,131 23    | 10       | \$9,826 84       | \$1,763 92                   | \$11,590 76        | 10,551       | \$7,003 04 | 3,701            | \$1,115 71   | 261,628          | \$5,147 85                                | 209,169          | { 61,900.16<br>6,850.21 } | \$99,632 89                                | 33,861.4        | \$5,515 64   | 34,681.0        | \$12,321 63   | 678 | \$1,067 58  | \$3,851 74                                 | \$33,861 79 |
| 1                | Phillipston,                    | 1897                     | 265                         | November, 1898                  | 4,933 33                  | 2,900       | 1,125 76          | 39.11       | 100 48    | 6 <sup>2</sup> | 262 60   | -                | -                            | -                  | -            | -          | -                | -  | 6,162            | 123 24                                    | 4,570            | 1,138.78                  | 2,003 61                                   | 1,336.0         | 267 20       | 975.0           | 321 75        | 9   | 18 00   | 91 13                                      | 619 26      |
| 2                | Phillipston, <sup>1</sup>       | 1898                     | 328                         | December, 1898                  | 5,450 85                  | 2,678       | 890 70            | 123.41      | 246 82    | 8              | 612 84   | -                | -                            | -                  | 255          | 127 75     | -                | -  | 8,133            | 162 66                                    | 1,720            | 1,611.35                  | 2,275 78                                   | -               | -            | 1,298.0         | 154 30        | 10  | 27 60   | 8 62                                       | 643 78      |
| 3                | Pittsfield, <sup>1</sup>        | 1897                     | 251                         | July, 1898                      | 956 41                    | 876         | 306 77            | -           | -         | -              | 13 77    | -                | -                            | -                  | 133          | 106 40     | -                | -  | -                | -   | 1,600            | 331.00                    | 261 80                                     | 692.0           | 163 80       | -               | -             | -   | -   | 1 50                                       | 156 37      |
| 4                | Pittsfield, <sup>2</sup>        | 1898                     | 325                         | December, 1898                  | 8,166 57                  | 2,350       | 939 92            | 179.80      | 761 15    | 3              | 752 86   | -                | -                            | -                  | 346          | 276 72     | -                | -  | 6,684            | 133 68                                    | 4,220            | 1,632.40                  | 3,178 86                                   | 1,174.0         | 187 87       | 3,170.0         | 1,006 30      | 10  | 53 74   | 8 25                                       | 864 22      |
| 5                | Plymouth, <sup>2</sup>          | 1896                     | 302                         | November, 1898                  | 5,309 34                  | 1,181       | 295 12            | -           | -         | -              | -        | -                | -                            | -                  | -            | -          | -                | -  | 11,467           | 258 01                                    | 8,670            | 2,093.35                  | 3,934 17                                   | -               | -            | -               | -             | -   | -   | 57 54                                      | 764 50      |
| 6                | Plymouth, <sup>3</sup>          | 1897, '98                | 276                         | April, 1898                     | 2,310 11                  | 6,090       | 1,218 00          | 55.10       | 110 20    | 4              | 245 70   | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -   | -   | 1 11                                       | 376 08      |
| 7                | Princeton,                      | 1897                     | 237                         | January, 1898                   | 129 15                    | -           | -                 | -           | -         | -              | -        | -                | -                            | -                  | 216          | 118 80     | -                | -  | -                | -   | -                | -                         | -  | 1,803.0         | 306 51       | -               | -             | -   | -   | -  | 10 35       |
| 8                | Quincy,                         | 1898                     | -                           | -                               | 102 73                    | -           | -                 | -           | -         | -              | 94 50    | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -   | -   | -  | 8 23        |
| 9                | Rehoboth,                       | 1896                     | 116                         | -                               | 8 71                      | -           | -                 | -           | -         | -              | -        | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -   | -   | -  | 8 71        |
| 10               | Revere (No. 1),                 | 1897                     | 278                         | October, 1898                   | 10,190 60                 | 9,074       | 4,283 70          | -           | -         | 4              | 190 84   | -                | -                            | -                  | 929          | 426 80     | -                | -  | 6,381            | 127 62                                    | 1,700            | 1,759.31                  | 3,518 68                                   | 2,127.0         | 319 65       | -               | -             | 8   | 22 00   | 219 35                                     | 1,082 47    |
| 11               | Revere (No. 2), <sup>2</sup>    | 1897                     | 288                         | November, 1898                  | 33,575 51                 | 8,025       | 4,086 75          | 7.50        | 11 25     | 5              | 572 10   | -                | -                            | -                  | 1,119        | 1,347 76   | -                | -  | 5,475            | 109 50                                    | 3,980            | 1,762.55                  | 3,559 60                                   | 1,369.0         | 241 28       | 424.0           | 169 60        | 11  | 31 50   | 20,262 10 <sup>4</sup>                     | 3,184 10    |
| 12               | Richmond, <sup>1</sup>          | 1897                     | 238                         | December, 1898                  | 1,241 42                  | 620         | 281 36            | -           | -         | -              | -        | -                | -                            | -                  | -            | -          | 750              | 262 50   | -                | -   | 2,340            | 390.00                    | 253 50                                     | 885.0           | 140 25       | 96.0            | 33 60         | -   | 3 36  | 73 62                                      | 179 73      |
| 13               | Richmond, <sup>2,4</sup>        | 1898                     | 338                         | December, 1898                  | 3,917 12                  | 7,200       | 1,920 07          | 27.90       | 32 55     | 6              | 211 92   | -                | -                            | -                  | 495          | 181 53     | -                | -  | -                | -   | 5,000            | 842.00                    | 361 84                                     | -               | -            | 3,131.0         | 730 46        | 7   | 15 40   | -  | 160 35      |
| 14               | Russell, <sup>1</sup>           | 1896                     | 158                         | July, 1898                      | 71 59                     | -           | -                 | 4.00        | 6 00      | 1              | 59 85    | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -   | -   | -  | 5 74        |
| 15               | Russell, <sup>1</sup>           | 1897                     | 229                         | November, 1898                  | 1,414 38                  | 1,352       | 405 51            | 8.00        | 14 00     | 1              | 81 91    | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | 5,330            | 903.00                    | 586 66                                     | 608.0           | 98 64        | -               | -             | 1   | 1 50  | 15 12                                      | 211 01      |
| 16               | Russell (No. 1), <sup>2,4</sup> | 1898                     | 291                         | December, 1898                  | 3,616 96                  | 3,801       | 1,140 27          | 19.30       | 28 95     | 5              | 421 90   | 1                | 348 10                       | 61 80              | 412 90       | -          | -                | -  | -                | -   | 5,750            | 621.00                    | 105 60                                     | 1,085.0         | 162 72       | 1,260.0         | 141 00        | 21  | 65 96   | -  | 537 66      |
| 17               | Russell (No. 2), <sup>2,4</sup> | 1898                     | 339                         | December, 1898                  | 1,588 97                  | 1,012       | 303 54            | 61.00       | 112 00    | 3 <sup>2</sup> | 353 64   | 1                | 405 65                       | 405 65             | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | 401.0           | 141 40        | 1   | 40 50   | -  | 262 21      |
| 18               | Sandwich,                       | 1897                     | 222                         | January, 1898                   | 32 71                     | -           | -                 | -           | -         | -              | -        | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | -                         | -  | 20.0            | 3 00         | -               | -             | -   | 50  | 26 59                                      | 2 62        |
| 19               | Sandwich, <sup>2</sup>          | 1898                     | 335                         | December, 1898                  | 2,006 19                  | 5,098       | 1,529 40          | -           | -         | 3 <sup>2</sup> | 58 80    | -                | -                            | 27 47 <sup>2</sup> | 27 47        | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | 10  | 26 10   | -  | 364 42      |
| 20               | Seitnate,                       | 1891                     | 165                         | April, 1898                     | 121 15                    | 202         | 70 80             | -           | -         | -              | -        | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | .07                       | 14   | -               | -            | -               | -             | -   | -   | 40 50                                      | 0 71        |
| 21               | Shrewsbury,                     | 1895                     | 78                          | February, 1898                  | 32 63                     | -           | -                 | -           | -         | -              | 30 00    | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -   | -   | -  | 2 63        |
| 22               | Shrewsbury,                     | 1896                     | 137                         | March, 1898                     | 18 92                     | -           | -                 | -           | -         | -              | 17 40    | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -   | -   | -  | 1 52        |
| 23               | Shrewsbury,                     | 1897                     | 194                         | March, 1898                     | 39 08                     | 17          | 7 65              | -           | -         | -              | -        | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | -                         | -  | -               | -            | -               | -             | -   | -   | -  | 3 13        |
| 24               | Shrewsbury,                     | 1898                     | 311                         | November, 1898                  | 6,104 71                  | 1,059       | 423 65            | 11.90       | 20 83     | 2              | 129 53   | -                | -                            | -                  | 1,031        | 878 90     | -                | -  | 7,467            | 149 31                                    | 1,840            | 1,733.30                  | 2,765 03                                   | 112.0           | 16 80        | 3,018.0         | 1,036 80      | 10  | 21 32   | 8 15                                       | 668 16      |
| 25               | Somerset,                       | 1897                     | 231                         | January, 1898                   | 42 43                     | 78          | 37 30             | -           | -         | -              | -        | -                | -                            | -                  | -            | -          | -                | -  | -                | -   | -                | -                         | -  | 16.0            | 2 40         | -               | -             | -   | -   | -  | 2 73        |
| 26               | South Hadley, <sup>2</sup>      | 1898                     | 343                         | December, 1898                  | 4,334 08                  | 912         | 182 40            | -           | -         | -              | -        | -                | -                            | -                  | 115          | 218 88     | -                | -  | 5,053            | 126                                       |                  |                           |  |                 |              |                 |               |     |   |  |             |





APPENDIX K.—Table showing Work done in 1898, and its Cost—Concluded.

|    | CITY—TOWN.                      | Lay-out. | No.<br>of Con-<br>tract. | Date<br>of<br>Last Payment. | Total<br>Value of Work<br>Done. | EXCAVATION AND<br>BORROW. |             | LEDGE EXCAVATION. |             | CULVERTS.      |             | BRIDGES. |                  |                              | GRAVEL.     |              | TELFORD.    |                  | SHAPING FOR<br>BROKEN STONE AND<br>GRAVEL SURFACING. |                  | BROKEN STONE AND GRAVEL FOR<br>SURFACING. |                  |                               | GUARD RAIL.                                |                 | SIDE DRAINS. |                 | STONE BOUNDS. |       | Miscellaneous<br>Items of<br>Construction,<br>Cost. | Engineering<br>and<br>Inspection,<br>Cost. |             |       |    |
|----|---------------------------------|----------|--------------------------|-----------------------------|---------------------------------|---------------------------|-------------|-------------------|-------------|----------------|-------------|----------|------------------|------------------------------|-------------|--------------|-------------|------------------|--|------------------|---|------------------|-------------------------------|--|-----------------|--------------|-----------------|---------------|-------|---|--|-------------|-------|----|
|    |                                 |          |                          |                             |                                 | Cubic Yards.              | Cost.       | Cubic Yards.      | Cost.       | No.            | Cost.       | No.      | Cost<br>Masonry. | Cost<br>Super-<br>structure. | Total.      | Cubic Yards. | Cost.       | Square<br>Yards. | Cost.  | Square<br>Yards. | Cost.                                     | Square<br>Yards. | Tons.                         | Cost, including<br>Payments to<br>Weigher. | Linear<br>Feet. | Cost.        | Linear<br>Feet. | Cost.         | No.   |   |  |             | Cost. |    |
|    | Brought forward,                |          |                          |                             | \$419,084 82                    | 217,573                   | \$71,630 54 | 16,106.98         | \$23,776 41 | 302            | \$30,376 34 | 13       | \$10,828 99      | \$1,956 87                   | \$12,785 86 | 21,198       | \$13,220 11 | 7,212.0          | \$2,343 63   | 382,170          | \$7,586 36                                | 320,376          | { 94,729.71<br>10,691.67 }    | \$150,745 99                               | 48,141.4        | \$7,918 76   | 53,982.0        | \$18,263 45   | 935   | \$2,715 53  | \$25,205 30                                | \$52,516 01 |       |    |
| 1  | Wayland,                        | 1897     | 241                      | July, 1898                  | 5,228 32                        | 401                       | 120 19      | 1.20              | 2 10        | 1              | 100 03      | -        | -                | -                            | -           | 295          | 147 60      | -                | -  | 7,703            | 154 06                                    | 5,370            | 1,976.37                      | 3,114 37                                   | 36.0            | 5 40         | 2,735.0         | 957 25        | 1     | 1 25  | -  | 626 07      | 1     |    |
| 2  | Wenham,                         | 1897     | 212                      | June, 1898                  | 153 64                          | 33                        | 25 75       | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | 33.11            | 62 91                         | -  | -               | -            | -               | -             | -     | 1 80  | 63 18                                      | 2           |       |    |
| 3  | Westborough,                    | 1897     | 270                      | August, 1898                | 5,899 72                        | 1,091                     | 640 14      | 1.85              | 3 24        | 8 <sup>a</sup> | 306 99      | -        | -                | -                            | -           | 873          | 436 50      | -                | -  | 6,767            | 135 33                                    | 5,370            | 2,005.74                      | 2,856 04                                   | 567.0           | 84 89        | 1,750.0         | 612 50        | 14    | 25 49   | 299 27 <sup>a</sup>                        | 599 23      | 3     |    |
| 4  | West Boylston, <sup>a</sup>     | 1897     | 231                      | December, 1898              | 7,239 48                        | 3,970                     | 893 17      | 128.62            | 257 04      | 11             | 1,303 30    | -        | -                | -                            | -           | 718          | 359 00      | -                | -  | 12,016           | 240 32                                    | 8,715            | 2,069.97                      | 2,069 97                                   | 2,097.0         | 293 01       | 2,873.0         | 877 21        | 22    | 22 00   | 19 10                                      | 901 26      | 4     |    |
| 5  | West Boylston, <sup>a,6</sup>   | 1898     | 332                      | December, 1898              | 4,078 90                        | 710                       | 213 04      | 51.83             | 90 70       | 6              | 824 00      | -        | -                | -                            | -           | 402          | 201 00      | -                | -  | 2,333            | 46 66                                     | { 2,000<br>2,420 | 548.00 <sup>a</sup><br>691.04 | 548 00<br>1,334 43                         | -               | -            | 984.0           | 295 20        | 8     | 20 83   | -  | 505 04      | 5     |    |
| 6  | Westfield (No. 1),              | 1898     | 295                      | November, 1898              | 1,982 39                        | 521                       | 182 46      | -                 | -           | -              | -           | -        | -                | -                            | -           | 196          | 98 20       | -                | -  | 4,068            | 81 36                                     | 3,050            | 1,131.34                      | 1,357 61                                   | -               | -            | -               | -             | 6     | 18 93   | -  | 243 83      | 6     |    |
| 7  | Westfield (No. 2), <sup>a</sup> | 1898     | 350                      | December, 1898              | 1,751 41                        | 445                       | 133 62      | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | 4,187            | 83 74                                     | 2,410            | 1,010.90                      | 1,263 63                                   | 130.0           | 19 50        | -               | -             | 8     | 28 05   | 7 11                                       | 215 76      | 7     |    |
| 8  | Westminster,                    | 1895     | 168                      | January, 1898               | 97 01                           | -                         | -           | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | 27.21                         | 40 81                                      | -               | -            | -               | -             | -     | -   | 45 23                                      | 10 97       | 8     |    |
| 9  | Westminster,                    | 1896     | 168                      | January, 1898               | 102 42                          | 120                       | 42 00       | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | 38               | 76  | -                | 16.95                         | 25 43                                      | -               | -            | -               | -             | -     | -   | 17 57                                      | 16 60       | 9     |    |
| 10 | Westminster,                    | 1897     | 195                      | December, 1898              | 320 15                          | 73                        | 21 90       | -                 | -           | 1              | 41 10       | -        | -                | -                            | -           | -            | -           | -                | -  | 560              | 11 20                                     | -                | 133.93                        | 182 14                                     | 110.0           | 16 50        | -               | -             | -     | -   | 21 65                                      | 25 66       | 10    |    |
| 11 | Westminster, <sup>a</sup>       | 1898     | 326                      | December, 1898              | 3,622 18                        | 1,200                     | 360 00      | 28.00             | 84 00       | 7              | 316 87      | -        | -                | -                            | -           | 500          | 250 00      | -                | -  | 5,140            | 102 80                                    | 3,520            | 1,247.43                      | 1,665 91                                   | 144.0           | 21 69        | 1,436.0         | 359 00        | 10    | 42 31   | -  | 419 69      | 11    |    |
| 12 | West Newbury,                   | 1897     | 198                      | June, 1898                  | 285 13                          | 48                        | 14 25       | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | 220 44                                     | 50 41       | 12    |    |
| 13 | Westport,                       | 1896     | 144                      | July, 1898                  | 50 39                           | -                         | 17 47       | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | 15.69                         | 23 38                                      | -               | -            | -               | -             | -     | -   | 5 50                                       | 4 04        | 13    |    |
| 14 | Westport,                       | 1898     | 289                      | September, 1898             | 7,791 78                        | 1,411                     | 707 00      | 5.30              | 21 20       | 6              | 763 05      | -        | -                | -                            | -           | 870          | 622 00      | -                | -  | 9,584            | 191 68                                    | 7,180            | 2,208.45                      | 3,694 94                                   | 126.0           | 31 60        | 2,355.0         | 942 00        | 6     | 25 48   | -  | 902 93      | 14    |    |
| 15 | West Tisbury,                   | 1896     | 129                      | February, 1898              | 262 45                          | 970                       | 242 50      | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | -  | 19 95       | 15    |    |
| 16 | West Tisbury,                   | 1897     | 208                      | February, 1898              | 172 46                          | 439                       | 158 61      | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | -  | 13 82       | 16    |    |
| 17 | Weymouth,                       | 1896     | 138                      | June, 1898                  | 86 73                           | -                         | -           | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | 41.65                         | 79 78                                      | -               | -            | -               | -             | -     | -   | -  | 6 95        | 17    |    |
| 18 | Weymouth,                       | 1897     | 209                      | November, 1898              | 2,069 37                        | 674                       | 235 93      | -                 | -           | -              | 2 67        | -        | -                | -                            | -           | 2            | 75          | -                | -  | 3,668            | 73 36                                     | 2,530            | 761.99                        | 1,425 85                                   | -               | -            | -               | -             | 6     | 9 00  | -  | 321 81      | 18    |    |
| 19 | Whitman,                        | 1895     | 94                       | March, 1898                 | 9 24                            | -                         | -           | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | -  | 8 50        | 74    | 19 |
| 20 | Whitman,                        | 1896     | 113                      | February, 1898              | 13 81                           | -                         | -           | -                 | -           | -              | 12 70       | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | -  | -           | 1 11  | 20 |
| 21 | Wilbraham,                      | 1897     | 224                      | - 1898                      | 8 15                            | -                         | -           | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | -  | 7 50        | 65    | 21 |
| 22 | Williamsburg,                   | 1896     | 146                      | January, 1898               | 16 14                           | -                         | -           | -                 | -           | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | -  | 14 85       | 1 29  | 22 |
| 23 | Williamsburg, <sup>a,7</sup>    | 1898     | 290                      | December, 1898              | 7,978 75                        | 17,308                    | 2,876 09    | 273.31            | 225 48      | 17             | 1,364 05    | 1        | 440 78           | 626 45                       | 1,067 23    | 607          | 166 81      | -                | -  | -                | -   | -                | -                             | -  | 1,500.0         | 123 75       | 3,643.0         | 701 28        | 35    | 94 15   | 21 41                                      | 1,338 50    | 23    |    |
| 24 | Williamstown,                   | 1896     | 139                      | July, 1898                  | 16 96                           | -                         | -           | -                 | 15 60       | -              | -           | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | -  | -           | 1 36  | 24 |
| 25 | Williamstown,                   | 1898     | 315                      | November, 1898              | 7,951 03                        | 3,482                     | 1,468 18    | 3.00              | 5 25        | 3              | 163 54      | -        | -                | -                            | -           | 464          | 301 47      | 596.6            | 178 95   | 8,507            | 170 14                                    | 6,070            | 2,307.21                      | 4,330 26                                   | -               | -            | 1,042.0         | 364 70        | 20    | 61 64   | -  | 903 90      | 25    |    |
| 26 | Windsor, <sup>4</sup>           | 1897     | 253                      | December, 1898              | 5,017 62                        | 1,004                     | 372 09      | -                 | -           | 5 <sup>a</sup> | 227 04      | 1        | 1,217 52         | 472 44                       | 1,689 96    | 329          | 148 05      | -                | -  | -                | -   | 2,450            | 387.16 <sup>a</sup>           | 232 30                                     | 728.0           | 109 24       | 100.0           | 35 00         | 3     | 4 80  | 1,348 03 <sup>a</sup>                      | 851 11      | 26    |    |
| 27 | Worcester,                      | 1896     | 122                      | December, 1898              | 92 21                           | -                         | -           | -                 | -           | 1              | 84 82       | -        | -                | -                            | -           | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | -  | -           | 7 39  | 27 |
| 28 | Worcester (Holden),             | 1897     | 277                      | December, 1898              | 8,642 66                        | 1,881                     | 711 20      | 66.28             | 99 42       | 12             | 1,681 36    | -        | -                | -                            | -           | 1,019        | 662 35      | 2,150.0          | 580 50   | 8,167            | 163 31                                    | 5,800            | 1,818.41                      | 2,360 64                                   | 1,320.0         | 193 08       | 3,711.0         | 1,113 30      | 24    | 46 92   | -  | 1,030 55    | 28    |    |
| 29 | Wrentham,                       | 1897     | 196                      | May, 1898                   | 259 40                          | -                         | -           | -                 | -           | -              | -           | -        | -                | -                            | -           | 38           | 15 20       | -                | -  | 1,515            | 57.48                                     | 150              | 57.48                         | 66 97                                      | 231.0           | 37 89        | -               | -             | -     | -   | 9 95                                       | 69 09       | 29    |    |
| 30 | Wrentham, <sup>a</sup>          | 1898     | 306                      | December, 1898              | 6,558 49                        | 3,010                     | 1,091 97    | 10.24             | 17 92       | 6              | 709 61      | -        | -                | -                            | -           | 232          | 127 60      | -                | -  | 6,417            | 128 34                                    | 6,500            | 2,228.10                      | 3,620 94                                   | 350.0           | 52 50        | -               | -             | 12    | 34 22   | -  | 875 30      | 30    |    |
| 31 | Yarmouth (Bridge),              | 1896     | 182                      | January, 1898               | 624 96                          | -                         | -           | -                 | -           | -              | -           | 1        | 235 65           | 267 39                       | 503 01      | -            | -           | -                | -  | -                | -   | -                | -                             | -  | -               | -            | -               | -             | -     | -   | -  | -           | 21 92 | 31 |
| 32 | Yarmouth (South),               | 1897     | 258                      | April, 1898                 | 7,475 15                        | 1,589                     | 412 05      | -                 | -           | 8              | 972 48      | -        | -                | -                            | -           | -            | -           | -                | -  | 13,652           | 273 04                                    | 8,813            | 2,802.66                      | 5,465 19                                   | -               | -            | -               | -             | 30    | 45 00   | -  | 307 39      | 32    |    |
|    | Total,                          |          |                          |                             | \$504,843 32 <sup>a</sup>       | 258,616                   | \$82,470 18 | 16,676.61         | \$24,598 36 | 393            | \$39,240 95 | 16       | \$12,722 94      | \$3,323 15                   | \$16,046 09 | 27,813       | \$16,656 61 | 9,958.6          | \$3,103 08   | 476,492          | \$9,472 79                                | 392,724          | { 117,318.34<br>11,629.83 }   | \$186,497 49                               | 55,483.4        | \$8,908 32   | 71,611.0        | \$24,520 89   | 1,146 | \$3,206 10  | \$27,245 71                                | \$62,876 72 |       |    |

<sup>1</sup> Cubic yards of gravel.      <sup>2</sup> Partly built this year.      <sup>3</sup> Cost building common wall.      <sup>4</sup> Gravel roads.      <sup>5</sup> Partly gravel.      <sup>6</sup> Roads on which work is yet to be done.      <sup>7</sup> Graded roads.      <sup>8</sup> Includes \$1,320.03 for retaining wall.      <sup>9</sup> Includes \$7,718.08 reserved on contracts and \$4,778.68 paid by town of Yarmouth.

| No. |  | Date |       | Description |  | Amount |  |
|-----|--|------|-------|-------------|--|--------|--|
| 1   |  | 1880 | Jan 1 | Balance     |  | 100.00 |  |
| 2   |  | 1880 | Feb 1 | Interest    |  | 1.00   |  |
| 3   |  | 1880 | Mar 1 | Interest    |  | 1.00   |  |
| 4   |  | 1880 | Apr 1 | Interest    |  | 1.00   |  |
| 5   |  | 1880 | May 1 | Interest    |  | 1.00   |  |
| 6   |  | 1880 | Jun 1 | Interest    |  | 1.00   |  |
| 7   |  | 1880 | Jul 1 | Interest    |  | 1.00   |  |
| 8   |  | 1880 | Aug 1 | Interest    |  | 1.00   |  |
| 9   |  | 1880 | Sep 1 | Interest    |  | 1.00   |  |
| 10  |  | 1880 | Oct 1 | Interest    |  | 1.00   |  |
| 11  |  | 1880 | Nov 1 | Interest    |  | 1.00   |  |
| 12  |  | 1880 | Dec 1 | Interest    |  | 1.00   |  |
| 13  |  | 1880 | Jan 1 | Interest    |  | 1.00   |  |
| 14  |  | 1880 | Feb 1 | Interest    |  | 1.00   |  |
| 15  |  | 1880 | Mar 1 | Interest    |  | 1.00   |  |
| 16  |  | 1880 | Apr 1 | Interest    |  | 1.00   |  |
| 17  |  | 1880 | May 1 | Interest    |  | 1.00   |  |
| 18  |  | 1880 | Jun 1 | Interest    |  | 1.00   |  |
| 19  |  | 1880 | Jul 1 | Interest    |  | 1.00   |  |
| 20  |  | 1880 | Aug 1 | Interest    |  | 1.00   |  |
| 21  |  | 1880 | Sep 1 | Interest    |  | 1.00   |  |
| 22  |  | 1880 | Oct 1 | Interest    |  | 1.00   |  |
| 23  |  | 1880 | Nov 1 | Interest    |  | 1.00   |  |
| 24  |  | 1880 | Dec 1 | Interest    |  | 1.00   |  |
| 25  |  | 1880 | Jan 1 | Interest    |  | 1.00   |  |
| 26  |  | 1880 | Feb 1 | Interest    |  | 1.00   |  |
| 27  |  | 1880 | Mar 1 | Interest    |  | 1.00   |  |
| 28  |  | 1880 | Apr 1 | Interest    |  | 1.00   |  |
| 29  |  | 1880 | May 1 | Interest    |  | 1.00   |  |
| 30  |  | 1880 | Jun 1 | Interest    |  | 1.00   |  |
| 31  |  | 1880 | Jul 1 | Interest    |  | 1.00   |  |
| 32  |  | 1880 | Aug 1 | Interest    |  | 1.00   |  |
| 33  |  | 1880 | Sep 1 | Interest    |  | 1.00   |  |
| 34  |  | 1880 | Oct 1 | Interest    |  | 1.00   |  |
| 35  |  | 1880 | Nov 1 | Interest    |  | 1.00   |  |
| 36  |  | 1880 | Dec 1 | Interest    |  | 1.00   |  |
| 37  |  | 1880 | Jan 1 | Interest    |  | 1.00   |  |
| 38  |  | 1880 | Feb 1 | Interest    |  | 1.00   |  |
| 39  |  | 1880 | Mar 1 | Interest    |  | 1.00   |  |
| 40  |  | 1880 | Apr 1 | Interest    |  | 1.00   |  |
| 41  |  | 1880 | May 1 | Interest    |  | 1.00   |  |
| 42  |  | 1880 | Jun 1 | Interest    |  | 1.00   |  |
| 43  |  | 1880 | Jul 1 | Interest    |  | 1.00   |  |
| 44  |  | 1880 | Aug 1 | Interest    |  | 1.00   |  |
| 45  |  | 1880 | Sep 1 | Interest    |  | 1.00   |  |
| 46  |  | 1880 | Oct 1 | Interest    |  | 1.00   |  |
| 47  |  | 1880 | Nov 1 | Interest    |  | 1.00   |  |
| 48  |  | 1880 | Dec 1 | Interest    |  | 1.00   |  |
| 49  |  | 1880 | Jan 1 | Interest    |  | 1.00   |  |
| 50  |  | 1880 | Feb 1 | Interest    |  | 1.00   |  |
| 51  |  | 1880 | Mar 1 | Interest    |  | 1.00   |  |
| 52  |  | 1880 | Apr 1 | Interest    |  | 1.00   |  |
| 53  |  | 1880 | May 1 | Interest    |  | 1.00   |  |
| 54  |  | 1880 | Jun 1 | Interest    |  | 1.00   |  |
| 55  |  | 1880 | Jul 1 | Interest    |  | 1.00   |  |
| 56  |  | 1880 | Aug 1 | Interest    |  | 1.00   |  |
| 57  |  | 1880 | Sep 1 | Interest    |  | 1.00   |  |
| 58  |  | 1880 | Oct 1 | Interest    |  | 1.00   |  |
| 59  |  | 1880 | Nov 1 | Interest    |  | 1.00   |  |
| 60  |  | 1880 | Dec 1 | Interest    |  | 1.00   |  |
| 61  |  | 1880 | Jan 1 | Interest    |  | 1.00   |  |
| 62  |  | 1880 | Feb 1 | Interest    |  | 1.00   |  |
| 63  |  | 1880 | Mar 1 | Interest    |  | 1.00   |  |
| 64  |  | 1880 | Apr 1 | Interest    |  | 1.00   |  |
| 65  |  | 1880 | May 1 | Interest    |  | 1.00   |  |
| 66  |  | 1880 | Jun 1 | Interest    |  | 1.00   |  |
| 67  |  | 1880 | Jul 1 | Interest    |  | 1.00   |  |
| 68  |  | 1880 | Aug 1 | Interest    |  | 1.00   |  |
| 69  |  | 1880 | Sep 1 | Interest    |  | 1.00   |  |
| 70  |  | 1880 | Oct 1 | Interest    |  | 1.00   |  |
| 71  |  | 1880 | Nov 1 | Interest    |  | 1.00   |  |
| 72  |  | 1880 | Dec 1 | Interest    |  | 1.00   |  |
| 73  |  | 1880 | Jan 1 | Interest    |  | 1.00   |  |
| 74  |  | 1880 | Feb 1 | Interest    |  | 1.00   |  |
| 75  |  | 1880 | Mar 1 | Interest    |  | 1.00   |  |
| 76  |  | 1880 | Apr 1 | Interest    |  | 1.00   |  |
| 77  |  | 1880 | May 1 | Interest    |  | 1.00   |  |
| 78  |  | 1880 | Jun 1 | Interest    |  | 1.00   |  |
| 79  |  | 1880 | Jul 1 | Interest    |  | 1.00   |  |
| 80  |  | 1880 | Aug 1 | Interest    |  | 1.00   |  |
| 81  |  | 1880 | Sep 1 | Interest    |  | 1.00   |  |
| 82  |  | 1880 | Oct 1 | Interest    |  | 1.00   |  |
| 83  |  | 1880 | Nov 1 | Interest    |  | 1.00   |  |
| 84  |  | 1880 | Dec 1 | Interest    |  | 1.00   |  |
| 85  |  | 1880 | Jan 1 | Interest    |  | 1.00   |  |
| 86  |  | 1880 | Feb 1 | Interest    |  | 1.00   |  |
| 87  |  | 1880 | Mar 1 | Interest    |  | 1.00   |  |
| 88  |  | 1880 | Apr 1 | Interest    |  | 1.00   |  |
| 89  |  | 1880 | May 1 | Interest    |  | 1.00   |  |
| 90  |  | 1880 | Jun 1 | Interest    |  | 1.00   |  |
| 91  |  | 1880 | Jul 1 | Interest    |  | 1.00   |  |
| 92  |  | 1880 | Aug 1 | Interest    |  | 1.00   |  |
| 93  |  | 1880 | Sep 1 | Interest    |  | 1.00   |  |
| 94  |  | 1880 | Oct 1 | Interest    |  | 1.00   |  |
| 95  |  | 1880 | Nov 1 | Interest    |  | 1.00   |  |
| 96  |  | 1880 | Dec 1 | Interest    |  | 1.00   |  |
| 97  |  | 1880 | Jan 1 | Interest    |  | 1.00   |  |
| 98  |  | 1880 | Feb 1 | Interest    |  | 1.00   |  |
| 99  |  | 1880 | Mar 1 | Interest    |  | 1.00   |  |
| 100 |  | 1880 | Apr 1 | Interest    |  | 1.00   |  |

## APPENDIX J.

## COST PER STANDARD MILE.

The following table gives the cost of finished roads per mile in length, reduced to a standard width of fifteen feet.

The column headed "Cities and Towns" includes all the roads built in the respective municipalities.

Under the general heading "Cost per Standard Mile of Road" the column headed "Total" includes the cost of engineering and building, but excludes the cost of administration expenses, and the salaries of the chief engineer and two assistants since the passage of the act of 1898. The column headed "Macadam or Gravel" shows the cost per standard mile of this part of the work only. The column headed "Same with Telford and Drains" shows the cost per mile, including the macadam and such telford and drains as were used, the difference between the amounts in the two columns showing the cost of telford and drains. In the same manner the cost of any two of the different kinds of work into which the construction is subdivided, as expressed in the several columns, is the difference between the amount in that column and the amount in the column next preceding it. The difference between the last column, headed "Same with Guard Rail," and the first column, headed "Total," includes various incidentals, such as engineering, stone bounds, paved gutters, finishing between limits, etc.

The first series of averages at the foot of the table includes those of the several items of all classes of roads; the second shows the same for graded roads on which no surfacing has been placed; the third, the same for gravel roads; the fourth, the same for macadam or stone roads.

It will be noted that those roads marked graded are completed in every detail, with the exception of the surfacing of either broken stone or gravel.

The averages given are of special value, as showing the extreme and varied conditions of road building in the Commonwealth.

In the beginning of its work the commission undertook to rebuild the poorest and most difficult parts of the roads petitioned for. This



policy tended to high-cost roads, with a gradually decreasing average cost, as the roads are extended and the less difficult sections are built. In many instances the cost per mile has been so great that the average cost will not be materially lowered for several years. It can be said, however, that during the last year the average cost per mile of all roads built has been reduced \$319. The average cost of roads built in 1898, as compared with all the roads built previous to that year, has been reduced \$716.

A study of this table shows that some of the roads there indicated are less than one mile in length, while the costs are reduced to a rate per mile. On several of these short sections of road, bridges or bridge abutments were built, the cost of which, distributed over the fractions of a mile, gives a higher rate per mile than will appear when the roads are extended.



## COST PER STANDARD MILE.

| CITIES AND TOWNS.                 | Square<br>Yards. | Standard<br>Miles. | COST PER STANDARD MILE OF ROAD. <sup>1</sup> |  |  |                      |                               |  |                             |
|-----------------------------------|------------------|--------------------|--|--|--|----------------------|-------------------------------|--|-----------------------------|
|                                   |                  |                    | Total.                                       | Macadam or<br>Gravel<br>Surfacing<br>and<br>Shaping. | Same with<br>Telford<br>and<br>Drains. | Same with<br>Gravel. | Same with<br>Excava-<br>tion. | Same with<br>Culverts<br>and<br>Bridges. | Same with<br>Guard<br>Rail. |
| Acushnet, . . . . .               | 5,270            | .598               | \$7,970 26                                   | \$4,600 71   | \$4,600 71                             | \$4,729 48           | \$5,484 74                    | \$6,015 11                               | \$6,015 11                  |
| Adams, . . . . .                  | 5,000            | .568               | 11,004 24                                    | 6,284 50   | 6,284 50                               | 6,386 63             | 7,445 07                      | 9,075 88                                 | 9,194 36                    |
| Andover, . . . . .                | 17,024           | 1.934              | 11,655 43                                    | 6,580 04   | 6,580 04                               | 6,968 87             | 9,338 73                      | 9,820 52                                 | 10,187 33                   |
| Ashby, . . . . .                  | 22,961           | 2.609              | 11,988 49                                    | 5,045 59   | 5,341 31                               | 5,343 51             | 8,380 72                      | 9,640 69                                 | 9,969 87                    |
| Ashfield, <sup>2</sup> . . . . .  | 13,000           | 1.613              | 213,718 43                                   | 2-   | 370 48                                 | 370 48               | 8,025 17                      | 10,906 38                                | 11,452 20                   |
| Athol, . . . . .                  | 16,081           | 1.821              | 9,029 41                                     | 7,049 05   | 7,064 64                               | 7,102 50             | 7,706 28                      | 8,234 49                                 | 8,367 25                    |
| Auburn, . . . . .                 | 16,945           | 1.925              | 10,986 96                                    | 5,927 22   | 6,161 01                               | 7,104 69             | 8,465 92                      | 9,542 39                                 | 9,729 81                    |
| Barnstable, . . . . .             | 7,691            | .873               | 7,572 16                                     | 4,615 00   | 4,615 00                               | 4,786 82             | 4,958 64                      | 6,468 15                                 | 6,468 15                    |
| Barre, . . . . .                  | 5,910            | .671               | 10,019 37                                    | 5,309 15   | 5,506 54                               | 5,645 00             | 6,983 01                      | 8,131 74                                 | 8,561 14                    |
| Bedford, . . . . .                | 4,785            | .543               | 10,092 56                                    | 5,302 02   | 6,086 81                               | 6,247 88             | 7,888 84                      | 8,247 58                                 | 8,439 11                    |
| Beverly, . . . . .                | 21,222           | 2.411              | 8,104 40                                     | 6,194 66   | 6,326 70                               | 6,513 55             | 7,058 16                      | 7,292 07                                 | 7,304 51                    |
| Bourne, . . . . .                 | 3,585            | .407               | 9,381 40                                     | 6,026 09   | 6,588 50                               | 6,662 21             | 7,863 93                      | 7,897 10                                 | 7,897 10                    |
| Boxborough, . . . . .             | 6,665            | .757               | 7,565 57                                     | 4,308 03   | 4,308 03                               | 4,440 22             | 5,813 60                      | 6,243 43                                 | 6,364 08                    |
| Brewster, . . . . .               | 21,860           | 2.484              | 8,513 31                                     | 5,540 36   | 5,580 68                               | 5,894 58             | 7,162 80                      | 7,432 87                                 | 7,647 86                    |
| Brimfield, <sup>3</sup> . . . . . | 10,265           | 1.166              | 34,959 19                                    | 31,411 32  | 1,411 32                               | 1,411 32             | 2,554 84                      | 3,807 56                                 | 3,981 49                    |
| Brockton, . . . . .               | 7,440            | .845               | 7,518 63                                     | 4,749 62   | 4,809 97                               | 4,825 95             | 5,827 13                      | 6,502 64                                 | 6,502 64                    |

<sup>1</sup> Compiled from all roads completed Dec. 31, 1898.<sup>2</sup> Graded only.<sup>3</sup> Gravel roads.

COST PER STANDARD MILE — Continued.

| CITIES AND TOWNS.               | Square<br>Yards. | Standard<br>Miles. | COST PER STANDARD MILE OF ROAD. <sup>1</sup> |  |                                     |                      |                               |  |                             |
|---------------------------------|------------------|--------------------|--|--|-------------------------------------|----------------------|-------------------------------|--|-----------------------------|
|                                 |                  |                    | Total.                                       | Macadam or<br>Gravel<br>Surfacing<br>and<br>Shaping. | Same with<br>Telford<br>and Drains. | Same with<br>Gravel. | Same with<br>Excava-<br>tion. | Same with<br>Culverts<br>and<br>Bridges. | Same with<br>Guard<br>Rail. |
| Brookfield, . . . . .           | 4,125            | .559               | \$11,639 71                                  | \$5,632 84   | \$6,722 20                          | \$7,143 75           | \$8,870 71                    | \$9,735 24                               | \$9,807 06                  |
| Buckland, . . . . .             | 20,355           | 2.313              | 11,995 87                                    | 6,538 29   | 6,614 47                            | 6,940 57             | 9,010 94                      | 9,644 09                                 | 10,113 56                   |
| Charlemont, . . . . .           | 3,385            | .385               | 15,918 36                                    | 6,904 18   | 7,766 98                            | 8,765 68             | 9,642 83                      | 13,451 94                                | 13,686 00                   |
| Chicopee, . . . . .             | 6,760            | .768               | 14,724 74                                    | 6,386 13   | 7,930 74                            | 9,595 62             | 11,645 48                     | 12,878 25                                | 12,878 25                   |
| Cohasset, . . . . .             | 4,165            | .473               | 8,982 45                                     | 4,493 36   | 4,493 36                            | 4,913 55             | 7,147 84                      | 7,517 12                                 | 7,719 45                    |
| Concord, . . . . .              | 12,865           | 1.462              | 7,325 82                                     | 4,690 06   | 4,817 35                            | 4,865 98             | 5,572 28                      | 6,164 66                                 | 6,331 06                    |
| Cottage City, . . . . .         | 20,855           | 2.369              | 8,637 75                                     | 6,307 09   | 6,307 09                            | 6,326 74             | 6,940 91                      | 7,012 11                                 | 7,275 91                    |
| Dalton, . . . . .               | 13,790           | 1.567              | 12,079 47                                    | 7,424 39   | 7,563 80                            | 7,759 54             | 9,292 76                      | 10,415 58                                | 10,415 58                   |
| Deerfield, . . . . .            | 13,485           | 1.552              | 11,784 91                                    | 7,465 49   | 7,581 81                            | 8,488 23             | 10,330 00                     | 10,613 13                                | 10,816 49                   |
| Dennis, . . . . .               | 37,525           | 4.264              | 6,382 47                                     | 4,314 47   | 4,314 47                            | 4,327 27             | 5,113 48                      | 5,365 46                                 | 5,513 30                    |
| Duxbury, . . . . .              | 11,980           | 1.361              | 7,846 50                                     | 4,821 59   | 4,882 65                            | 5,012 01             | 5,965 99                      | 6,179 27                                 | 6,436 72                    |
| Edgartown, . . . . .            | 2,840            | .323               | 11,151 41                                    | 7,970 68   | 7,970 68                            | 7,970 68             | 8,200 84                      | 8,200 84                                 | 8,290 30                    |
| Easthampton, . . . . .          | 11,305           | 1.285              | 12,217 66                                    | 6,069 57   | 7,590 15                            | 8,734 70             | 10,180 62                     | 10,604 98                                | 10,835 25                   |
| Fairhaven, . . . . .            | 12,760           | 1.450              | 7,084 97                                     | 4,162 81   | 4,848 83                            | 5,349 55             | 5,709 09                      | 5,825 80                                 | 5,870 92                    |
| Fitchburg, . . . . .            | 14,192           | 1.613              | 14,456 08                                    | 6,261 72   | 6,490 34                            | 6,932 99             | 10,028 68                     | 12,327 43                                | 12,663 32                   |
| Gardner, <sup>2</sup> . . . . . | 20,865           | 2.371              | 5,988 95                                     | 2.   | 157 07                              | 170 56               | 3,107 90                      | 4,628 13                                 | 4,829 81                    |
| Gloucester, . . . . .           | 14,120           | 1.604              | 10,883 07                                    | 4,843 08   | 4,941 30                            | 5,265 99             | 8,530 20                      | 8,885 05                                 | 9,217 09                    |
| Goshen, . . . . .               | 16,780           | 1.907              | 20,566 73                                    | 7,439 69   | 10,322 06                           | 11,707 67            | 16,148 20                     | 17,221 67                                | 17,682 72                   |

|                                |       |                        |                       |           |           |           |           |           |
|--------------------------------|-------|------------------------|-----------------------|-----------|-----------|-----------|-----------|-----------|
| Grafton, .                     | .786  | 7,541 20               | 4,790 33              | 4,790 33  | 4,949 36  | 5,660 75  | 6,194 52  | 6,395 96  |
| Granby, .                      | .634  | 18,083 90              | 9,174 44              | 11,329 99 | 14,014 87 | 15,357 95 | 16,135 71 | 16,685 92 |
| Great Barrington, .            | .926  | 9,610 61               | 7,259 96              | 7,279 90  | 7,279 90  | 7,899 56  | 8,660 78  | 8,960 78  |
| Great Barrington, <sup>3</sup> |       | <sup>s</sup> 10,633 42 | <sup>s</sup> 503 04   | 646 65    | 774 42    | 8,176 86  | 8,831 04  | 9,089 43  |
| Hadley, .                      | 1.857 | 12,268 56              | 7,012 89              | 7,428 46  | 7,850 16  | 10,875 81 | 10,987 10 | 11,147 23 |
| Hancock, <sup>3</sup>          | 2.235 | <sup>s</sup> 11,604 02 | <sup>s</sup> 741 08   | 1,746 97  | 1,989 25  | 6,977 90  | 8,901 67  | 9,998 82  |
| Hardwick, etc.,                | 2.250 | 8,591 03               | 4,588 96              | 4,959 71  | 4,976 90  | 6,111 31  | 7,016 11  | 7,125 08  |
| Hingham, <sup>3</sup>          | .902  | <sup>s</sup> 4,624 50  | <sup>s</sup> Lump sum | -         | -         | -         | -         | -         |
| Hingham,                       | 1.422 | 7,455 70               | 4,013 39              | 4,062 90  | 4,325 79  | 5,800 58  | 6,320 44  | 6,400 00  |
| Holbrook, <sup>2</sup>         | 1.237 | <sup>2</sup> 1,998 69  | <sup>2</sup> -        | 52 18     | 364 90    | 953 90    | 1,415 80  | 1,435 62  |
| Holden, .                      | 1.106 | 8,195 28               | 4,372 71              | 4,884 29  | 5,638 79  | 6,238 24  | 6,810 86  | 6,931 59  |
| Huntington, .                  | 3.243 | 15,435 78              | 6,547 96              | 6,769 00  | 7,402 67  | 10,129 60 | 11,215 74 | 11,695 04 |
| Lawrence, .                    | 1.015 | 6,430 53               | 4,663 43              | 4,663 43  | 4,693 44  | 5,537 19  | 5,537 19  | 5,553 59  |
| Lee, .                         | .320  | 12,231 29              | 7,101 00              | 7,429 40  | 7,940 50  | 8,820 64  | 9,953 85  | 10,035 72 |
| Leecester, .                   | 2.079 | 13,774 84              | 6,406 85              | 7,670 70  | 8,612 55  | 9,936 47  | 10,849 44 | 10,868 77 |
| Lexington, .                   | 2.065 | 9,496 21               | 4,740 93              | 5,061 28  | 5,163 64  | 7,175 88  | 7,591 95  | 7,918 54  |
| Lincoln, .                     | 3.446 | 7,866 60               | 4,992 10              | 5,277 05  | 5,299 60  | 6,310 98  | 6,445 30  | 6,727 65  |
| Lowell, .                      | 2.059 | 8,245 53               | 5,797 42              | 5,961 93  | 6,545 52  | 6,882 95  | 7,004 98  | 7,004 98  |
| Lunenburg, .                   | 2.570 | 10,017 62              | 4,390 00              | 4,390 00  | 4,552 35  | 5,643 88  | 8,516 17  | 8,686 77  |
| Marion, .                      | .437  | 9,211 47               | 5,064 56              | 5,064 56  | 6,145 36  | 6,848 70  | 7,267 15  | 7,482 57  |
| Marlborough, .                 | 2.041 | 9,968 56               | 4,410 39              | 4,761 93  | 5,101 24  | 7,939 31  | 8,429 55  | 8,441 63  |
| Marshfield, .                  | 1.137 | 9,071 43               | 5,130 82              | 5,161 26  | 5,686 20  | 7,435 70  | 7,523 75  | 7,684 40  |
|                                | .986  |                        |                       |           |           |           |           |           |

<sup>1</sup> Compiled from all roads completed Jan. 1, 1899.<sup>2</sup> Graded only.<sup>3</sup> Gravel roads.

COST PER STANDARD MILE—Continued.

| CITIES AND TOWNS.                          | Square Yards. | Standard Miles. | COST PER STANDARD MILE OF ROAD. <sup>1</sup> |  |                               |                   |                       |                                 |                       |
|--|---------------|-----------------|--|--|-------------------------------|-------------------|-----------------------|---------------------------------|-----------------------|
|  |               |                 | Total.                                       | Macadam or Gravel Surfacing and Shaping. | Same with Telford and Drains. | Same with Gravel. | Same with Excavation. | Same with Culverts and Bridges. | Same with Guard Rail. |
| Mattapoisett, . . . . .                    | 10,550        | 1.199           | \$9,283 01                                   | \$3,898 46                               | \$4,146 59                    | \$4,508 07        | \$5,004 58            | \$6,992 19                      | \$7,008 44            |
| Merrimac, . . . . .                        | 4,930         | .560            | 11,819 56                                    | 5,389 11                                 | 6,974 98                      | 8,029 47          | 9,190 57              | 9,750 50                        | 9,854 69              |
| Methuen, . . . . .                         | 9,130         | 1.037           | 7,093 62                                     | 4,424 08                                 | 4,424 08                      | 4,721 59          | 5,474 54              | 5,897 82                        | 6,095 12              |
| Middleborough, . . . . .                   | 24,285        | 2.759           | 7,450 15                                     | 4,497 51                                 | 4,497 51                      | 4,646 70          | 5,947 49              | 6,229 39                        | 6,396 34              |
| Monson, . . . . .                          | 8,220         | .934            | 8,155 58                                     | 5,705 99                                 | 5,705 99                      | 5,923 52          | 6,779 25              | 7,020 79                        | 7,160 05              |
| Montague, . . . . .                        | 9,020         | 1.193           | 6,775 52                                     | 5,195 19                                 | 5,195 19                      | 5,195 19          | 5,977 41              | 5,977 41                        | 5,977 41              |
| Nantucket, . . . . .                       | 35,340        | 4.016           | 9,752 75                                     | 5,985 11                                 | 5,985 11                      | 7,958 45          | 8,673 04              | 8,693 42                        | 8,740 01              |
| Newburyport, . . . . .                     | 7,765         | .882            | 9,355 54                                     | 4,899 58                                 | 5,255 20                      | 5,296 02          | 7,460 22              | 7,768 61                        | 7,868 67              |
| Norfolk, <sup>2</sup> . . . . .            | 12,725        | 1.446           | <sup>2</sup> 5,549 05                        | 2 -                                      | -                             | 1,659 54          | 3,058 47              | 3,943 85                        | 4,746 23              |
| North Adams, . . . . .                     | 14,855        | 1.688           | 9,808 90                                     | 7,364 97                                 | 7,364 97                      | 7,851 11          | 8,176 09              | 8,572 82                        | 8,811 66              |
| Northampton, . . . . .                     | 9,553         | 1.090           | 9,113 68                                     | 5,221 94                                 | 5,825 63                      | 6,237 65          | 7,563 07              | 8,052 93                        | 8,140 72              |
| North Attleborough, . . . . .              | 15,411        | 1.751           | 5,737 57                                     | 4,125 92                                 | 4,246 53                      | 4,470 69          | 4,996 41              | 5,110 67                        | 5,178 86              |
| North Attleborough, <sup>3</sup> . . . . . | 13,045        | 1.550           | <sup>3</sup> 6,638 98                        | <sup>3</sup> 1,332 35                    | 1,752 91                      | 2,285 78          | 4,432 47              | 5,645 07                        | 5,825 78              |
| Northborough, . . . . .                    | 5,540         | .629            | 9,532 16                                     | 3,793 77                                 | 4,340 28                      | 4,632 18          | 7,262 64              | 8,001 59                        | 8,001 59              |
| North Reading, . . . . .                   | 4,400         | .500            | 8,985 84                                     | 5,123 06                                 | 5,123 06                      | 5,173 06          | 7,186 66              | 7,186 66                        | 7,733 26              |
| Norwood, . . . . .                         | 13,915        | 1.581           | 9,498 00                                     | 5,044 90                                 | 6,160 43                      | 7,168 83          | 7,883 95              | 8,397 22                        | 8,472 74              |
| Orange, . . . . .                          | 21,439        | 2.436           | 10,616 37                                    | 8,195 90                                 | 8,234 38                      | 8,465 40          | 9,253 66              | 9,533 21                        | 9,650 18              |
| Paxton, . . . . .                          | 25,528        | 3.242           | 13,297 88                                    | 5,271 05                                 | 7,929 18                      | 8,967 29          | 10,776 06             | 11,561 30                       | 11,762 31             |



|                                    |        |       |                        |                       |          |          |           |           |           |
|------------------------------------|--------|-------|------------------------|-----------------------|----------|----------|-----------|-----------|-----------|
| Phillipston, . . . . .             | 4,570  | .519  | 14,303 12              | 5,083 12              | 5,703 08 | 5,703 08 | 9,814 66  | 11,644 20 | 12,159 08 |
| Pittsfield, . . . . .              | 13,575 | 1.543 | 12,582 94              | 6,336 68              | 7,025 15 | 7,487 60 | 9,418 45  | 10,209 72 | 10,349 05 |
| Pittsfield, <sup>3</sup> . . . . . | 6,735  | .765  | <sup>3</sup> 4,430 32  | <sup>3</sup> 1,226 09 | 1,228 09 | 1,717 12 | 3,018 18  | 3,444 76  | 3,580 45  |
| Plymouth, . . . . .                | 12,510 | 1.422 | 13,028 60              | 6,395 78              | 6,424 26 | 6,554 01 | 7,988 18  | 10,443 01 | 10,532 87 |
| Plymouth, <sup>2</sup> . . . . .   | 21,390 | 2.431 | <sup>2</sup> 4,695 59  | <sup>2</sup> -        | -        | -        | 3,028 62  | 3,253 59  | 3,682 26  |
| Princeton, . . . . .               | 4,335  | .492  | 10,466 60              | 4,410 55              | 5,069 29 | 6,423 05 | 7,311 85  | 8,562 91  | 8,988 51  |
| Rehoboth, . . . . .                | 13,665 | 1.553 | 9,479 24               | 4,631 70              | 4,631 70 | 4,631 70 | 7,329 99  | 8,078 07  | 8,633 18  |
| Revere, . . . . .                  | 4,700  | .534  | 19,641 70              | 6,828 28              | 6,828 28 | 7,627 70 | 16,039 12 | 16,396 50 | 16,993 97 |
| Richmond, <sup>3</sup> . . . . .   | 4,165  | .473  | <sup>3</sup> 11,394 46 | <sup>3</sup> 1,451 37 | 4,462 71 | 4,462 71 | 9,206 13  | 9,549 13  | 9,845 65  |
| Russell, . . . . .                 | 20,310 | 2.308 | 22,422 80              | 6,746 33              | 6,928 76 | 8,422 99 | 13,532 62 | 16,587 94 | 17,164 34 |
| Russell, <sup>3</sup> . . . . .    | 16,770 | 1.906 | <sup>3</sup> 8,443 42  | <sup>3</sup> 1,001 69 | 1,103 44 | 1,103 44 | 5,358 56  | 6,571 54  | 7,074 20  |
| Sandwich, . . . . .                | 8,800  | 1.000 | 6,784 60               | 4,426 41              | 4,426 41 | 4,426 41 | 5,346 48  | 5,805 36  | 5,860 56  |
| Scituate, . . . . .                | 10,240 | 1.164 | 9,359 13               | 6,823 82              | 6,823 82 | 6,365 56 | 7,373 27  | 7,767 00  | 7,783 67  |
| Shelburne, . . . . .               | 20,315 | 2.308 | 10,202 65              | 5,004 87              | 5,303 00 | 5,402 55 | 6,528 64  | 7,272 98  | 7,463 78  |
| Shrewsbury, . . . . .              | 28,258 | 3.211 | 8,880 87               | 5,189 86              | 5,609 15 | 6,337 00 | 7,288 97  | 7,592 93  | 7,732 38  |
| Somerset, . . . . .                | 18,525 | 2.105 | 8,107 63               | 4,888 75              | 4,888 75 | 5,230 00 | 6,024 57  | 6,637 11  | 6,747 46  |
| South Hadley, . . . . .            | 8,085  | .919  | 9,871 32               | 7,178 38              | 7,178 38 | 7,241 93 | 8,219 78  | 8,721 98  | 8,762 73  |
| Sterling, . . . . .                | 11,400 | 1.295 | 8,287 65               | 4,905 62              | 4,905 62 | 5,066 23 | 6,429 46  | 7,089 88  | 7,120 52  |
| Stoneham, . . . . .                | 5,010  | .569  | 12,762 41              | 5,578 84              | 5,602 22 | 6,098 55 | 10,574 93 | 10,817 35 | 10,817 35 |
| Sturbridge, . . . . .              | 5,155  | .587  | 11,010 56              | 4,927 70              | 6,927 89 | 7,561 89 | 8,522 93  | 9,185 88  | 9,274 53  |
| Sudbury, . . . . .                 | 3,655  | .415  | 8,948 14               | 4,719 82              | 4,719 82 | 4,866 82 | 6,323 70  | 7,203 93  | 7,300 00  |
| Sunderland, . . . . .              | 1,655  | .180  | 15,474 50              | 8,083 72              | 8,083 72 | 9,387 05 | 9,744 22  | 12,785 44 | 13,047 94 |

<sup>3</sup> Gravel roads.<sup>2</sup> Graded only.<sup>1</sup> Compiled from all roads completed Jan. 1, 1899.

COST PER STANDARD MILE — *Concluded.*

| CITIES AND TOWNS.                     | Square<br>Yards. | Standard<br>Miles. | COST PER STANDARD MILE OF ROAD. <sup>1</sup> |  |                                     |                      |                          |  |                                    |
|---------------------------------------|------------------|--------------------|--|--|-------------------------------------|----------------------|--------------------------|--|------------------------------------|
|                                       |                  |                    | Total.                                       | Macadam or<br>Gravel<br>Surfacing<br>and<br>Shaping. | Same with<br>Telford<br>and Drains. | Same with<br>Gravel. | Same with<br>Excavation. | Same with<br>Culverts<br>and<br>Bridges. | Same with<br>Guard<br>and<br>Rail. |
| Taunton, . . . . .                    | 15,785           | 1.794              | \$8,467 34                                   | \$5,343 95   | \$5,343 95                          | \$6,013 79           | \$6,956 86               | \$7,230 03                               | \$7,387 92                         |
| Tisbury, . . . . .                    | 16,970           | 1.929              | 7,573 58                                     | 4,781 39   | 4,781 39                            | 4,781 39             | 6,059 23                 | 6,059 23                                 | 6,219 91                           |
| Townsend, . . . . .                   | 4,155            | .472               | 5,542 64                                     | 2,993 41   | 3,172 86                            | 3,172 86             | 3,937 37                 | 4,260 15                                 | 4,516 08                           |
| Truro, . . . . .                      | 7,612            | .865               | 10,031 17                                    | 2,909 64   | 2,909 64                            | 2,909 64             | 7,274 83                 | 7,274 83                                 | 7,963 98                           |
| Tyngaborough, . . . . .               | 25,890           | 2.942              | 9,009 85                                     | 7,283 25   | 7,341 23                            | 8,144 35             | 8,194 04                 | done by<br>county.                       |                                    |
| Uxbridge, . . . . .                   | 5,940            | .675               | 9,373 36                                     | 4,661 18   | 4,661 18                            | 5,190 07             | 7,444 34                 | 8,283 45                                 | 8,591 16                           |
| Walpole, . . . . .                    | 24,195           | 2.749              | 10,354 83                                    | 5,306 78   | 5,896 39                            | 6,244 65             | 8,338 33                 | 8,518 01                                 | 8,922 43                           |
| Wareham, . . . . .                    | 14,240           | 1.618              | 7,592 19                                     | 5,037 55   | 5,037 55                            | 5,251 11             | 6,518 43                 | 6,591 78                                 | 6,666 44                           |
| Warren, . . . . .                     | 12,770           | 1.451              | 9,392 42                                     | 5,755 98   | 6,384 30                            | 6,756 46             | 7,225 99                 | 8,048 05                                 | 8,104 82                           |
| Watertown, . . . . .                  | 13,468           | 1.529              | 8,182 23                                     | 6,982 60   | 6,982 60                            | 7,070 44             | 7,422 67                 | 7,927 18                                 | 7,927 18                           |
| Wayland, . . . . .                    | 5,335            | .606               | 9,544 50                                     | 5,393 45   | 6,973 07                            | 7,216 63             | 8,070 97                 | 8,238 04                                 | 8,244 95                           |
| Wenham, . . . . .                     | 5,325            | .605               | 10,520 05                                    | 6,732 97   | 6,732 97                            | 6,732 97             | 8,063 42                 | 8,740 27                                 | 8,889 44                           |
| Westborough, . . . . .                | 10,000           | 1.136              | 11,112 31                                    | 4,569 41   | 5,486 93                            | 6,666 51             | 9,041 56                 | 9,311 79                                 | 9,386 61                           |
| West Boylston, <sup>2</sup> . . . . . | 8,715            | .990               | 27,372 58                                    | 2,333 83   | 3,219 90                            | 3,582 42             | 4,744 34                 | 6,060 68                                 | 6,357 90                           |
| Westfield, . . . . .                  | 21,408           | 2.433              | 7,649 53                                     | 4,887 45   | 5,490 93                            | 5,780 77             | 6,613 05                 | 6,712 78                                 | 6,881 15                           |
| Westminster, . . . . .                | 19,915           | 2.263              | 11,819 51                                    | 5,596 48   | 5,612 18                            | 5,988 42             | 8,646 71                 | 9,688 87                                 | 10,081 99                          |
| West Newbury, . . . . .               | 19,675           | 2.236              | 10,987 08                                    | 5,522 78   | 6,568 54                            | 7,706 80             | 8,465 98                 | 8,820 86                                 | 8,919 77                           |
| Westport, . . . . .                   | 44,918           | 5.104              | 7,724 78                                     | 5,056 91   | 5,223 84                            | 5,716 64             | 6,436 21                 | 6,883 03                                 | 6,884 51                           |

|                                   |           |         |            |            |            |            |            |            |            |
|-----------------------------------|-----------|---------|------------|------------|------------|------------|------------|------------|------------|
| West Springfield, . . . . .       | 12,180    | 1,384   | 7,664 92   | 4,706 36   | 5,711 92   | 6,120 30   | 6,424 12   | 7,195 22   | 7,195 22   |
| West Tisbury, . . . . .           | 19,840    | 2,254   | 7,692 56   | 5,423 14   | 5,423 14   | 5,423 14   | 6,173 92   | 6,173 92   | 6,173 92   |
| Weymouth, . . . . .               | 18,605    | 2,114   | 12,593 73  | 7,451 85   | 7,578 83   | 7,877 01   | 10,098 72  | 10,484 64  | 10,874 47  |
| Whitman, . . . . .                | 17,922    | 2,037   | 12,377 77  | 6,680 62   | 6,931 73   | 8,287 01   | 9,827 47   | 10,597 37  | 10,617 50  |
| Wilbraham, . . . . .              | 16,780    | 1,907   | 9,576 91   | 6,934 66   | 6,934 66   | 7,265 88   | 8,042 94   | 8,291 95   | 8,474 14   |
| Williamburg, . . . . .            | 5,165     | .587    | 15,886 30  | 5,086 45   | 6,958 39   | 6,958 39   | 10,681 07  | 12,475 08  | 12,644 12  |
| Williamstown, . . . . .           | 16,915    | 1,922   | 13,464 23  | 6,867 06   | 8,282 72   | 9,817 85   | 11,715 34  | 12,112 99  | 12,196 03  |
| Windsor, <sup>1</sup> . . . . .   | 2,500     | .284    | 23,910 17  | 2,179 75   | 1,938 91   | 2,604 82   | 6,151 79   | 13,871 16  | 14,255 91  |
| Worcester, . . . . .              | 17,740    | 2,011   | 12,028 24  | 4,383 93   | 6,215 86   | 6,794 05   | 8,176 17   | 9,854 85   | 10,172 59  |
| Wrentham, . . . . .               | 18,750    | 2,131   | 8,631 56   | 4,578 26   | 4,604 77   | 5,292 25   | 6,983 54   | 7,306 60   | 7,337 58   |
| Yarmouth, . . . . .               | 77,425    | 8,798   | 7,829 84   | 5,675 58   | 5,675 58   | 5,938 05   | 6,478 01   | 7,006 94   | 7,075 84   |
| Totals, . . . . .                 | 1,730,098 | 196,602 | -          | -          | -          | -          | -          | -          | -          |
| Average, all, . . . . .           | -         | -       | \$9,722 23 | \$5,178 05 | \$5,441 06 | \$5,895 69 | \$7,494 69 | \$8,159 71 | \$8,348 58 |
| Average, graded only, . . . . .   | -         | -       | 6,465 61   | -          | 114 61     | 424 36     | 3,696 75   | 4,878 20   | 5,252 72   |
| Average, gravel roads, . . . . .  | -         | 8,967   | 8,486 57   | 1,111 25   | 1,635 48   | 1,860 73   | 5,698 32   | 7,048 74   | 7,476 75   |
| Average, macadam roads, . . . . . | -         | 12,663  | 9,978 54   | 5,705 69   | 5,958 52   | 6,435 31   | 7,810 04   | 8,403 35   | 8,567 03   |
| Average, . . . . .                | -         | 174,972 | -          | -          | -          | -          | -          | -          | -          |

<sup>2</sup> Gravel roads.<sup>1</sup> Compiled from all roads completed Dec. 31, 1898.

## APPENDIX L.

STATEMENT SHOWING ALL PETITIONS RECEIVED,  
WITH LENGTHS OF WAY PETITIONED FOR, AND  
LAY-OUTS MADE, TOGETHER WITH SUMMARY BY  
COUNTIES.*Barnstable County.*

| COUNTY, CITY OR<br>TOWN.         | No. | Petition<br>Received. | LENGTH<br>PETITIONED<br>FOR. |        | LENGTH LAID OUT. |        |        |        |
|----------------------------------|-----|-----------------------|------------------------------|--------|------------------|--------|--------|--------|
|                                  |     |                       | Feet.                        | Miles. | 1894-97.         |        | 1898.  |        |
|                                  |     |                       |                              |        | Feet.            | Miles. | Feet.  | Miles. |
| Barnstable, <sup>1</sup> . . .   | 125 | July 31, 1895,        | 10,548                       | 2.00   | -                | -      | -      | -      |
| Barnstable, <sup>2,3</sup> . . . | 231 | Feb. 13, 1896,        | 10,560                       | 2.00   | 4,452            | .84    | -      | -      |
| Barnstable, <sup>1,4</sup> . . . | 418 | Apr. 23, 1898,        | 9,625                        | 1.82   | -                | -      | -      | -      |
| Bourne, <sup>5</sup> . . . . .   | 124 | Jan. 29, 1895,        | 16,125                       | 3.05   | -                | -      | -      | -      |
| Bourne, <sup>6</sup> . . . . .   | 338 | May 1, 1897,          | 7,470                        | 1.42   | 1,836            | .35    | 5,634  | 1.07   |
| Bourne, <sup>7</sup> . . . . .   | 445 | Dec. 19, 1898,        | 25,730                       | 4.88   | -                | -      | -      | -      |
| Brewster, . . . . .              | 118 | Jan. 15, 1895,        | 40,982                       | 7.76   | 13,117           | 2.49   | -      | -      |
| Chatham, . . . . .               | 155 | Apr. 4, 1895,         | 10,639                       | 2.01   | -                | -      | -      | -      |
| Dennis, <sup>1</sup> . . . . .   | 102 | Nov. 27, 1894,        | 22,500                       | 4.27   | 13,597           | 2.57   | 8,914  | 1.69   |
| Dennis, <sup>2</sup> . . . . .   | 126 | Feb. 6, 1895,         | 17,225                       | 3.26   | -                | -      | -      | -      |
| Eastham, . . . . .               | 209 | Aug. 5, 1895,         | 34,141                       | 6.47   | -                | -      | -      | -      |
| Harwich, . . . . .               | 106 | Dec. 22, 1894,        | 26,150                       | 4.95   | -                | -      | -      | -      |
| Orleans, . . . . .               | 182 | May 27, 1895,         | 10,440                       | 1.93   | -                | -      | -      | -      |
| Provincetown, . . . .            | 186 | June 4, 1895,         | 14,790                       | 2.80   | -                | -      | -      | -      |
| Sandwich, . . . . .              | 98  | Nov. 23, 1894,        | 9,000                        | 1.70   | 5,280            | 1.00   | 3,720  | .70    |
| Sandwich, . . . . .              | 430 | July 15, 1893,        | 6,349                        | 1.20   | -                | -      | 676    | .13    |
| Truro, . . . . .                 | 95  | Oct. 22, 1894,        | 12,478                       | 2.36   | 12,478           | 2.36   | -      | -      |
| Truro, . . . . .                 | 386 | Dec. 1, 1897,         | 20,503                       | 3.83   | -                | -      | -      | -      |
| Wellfleet, . . . . .             | 229 | Jan. 30, 1896,        | 10,203                       | 1.93   | -                | -      | -      | -      |
| Yarmouth, <sup>1</sup> . . . . . | 90  | Sept. 28, 1894,       | 19,634                       | 3.72   | 19,585           | 3.71   | -      | -      |
| Yarmouth, <sup>2</sup> . . . . . | 100 | Nov. 26, 1894,        | 26,900                       | 5.10   | 26,825           | 5.08   | -      | -      |
| Totals, . . . . .                |     |                       | 361,992                      | 68.56  | 97,170           | 18.40  | 18,944 | 3.59   |

Twenty-one petitions, in thirteen towns.

Average distance petitioned for, 17,238 feet (3.27 miles).

Twenty-seven lay-outs, in seven towns; all on town petitions.

Distance laid out, 116,114 feet (21.99 miles); average, 4,300 feet (.81 mile).

Percentage of length laid out to length petitioned for, 32.07.

<sup>1</sup> North county road.<sup>3</sup> From Yarmouth line.<sup>5</sup> Plymouth line to Sandwich line.<sup>7</sup> Bourne Village to Sandwich line.<sup>2</sup> South county road.<sup>4</sup> From Sandwich line.<sup>6</sup> Bourne Village to Wareham line.

*Berkshire County.*

| COUNTY, CITY OR TOWN.             | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|-----------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                   |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                   |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Adams, <sup>1,2</sup> . . . .     | 48  | July 18, 1894,     | 12,298                 | 2.33   | -                | -      | -     | -      |
| Adams, <sup>3</sup> . . . .       | 279 | July 30, 1896,     | 5,280                  | 1.00   | 3,000            | .57    | -     | -      |
| Adams, <sup>4</sup> . . . .       | 376 | Oct. 16, 1897,     | 12,582                 | 2.38   | -                | -      | -     | -      |
| Becket, . . . .                   | 117 | Jan. 12, 1895,     | 10,560                 | 2.00   | -                | -      | -     | -      |
| Becket, . . . .                   | 440 | Dec. 16, 1898,     | 53,430                 | 10.12  | -                | -      | -     | -      |
| Berkshire County, <sup>5</sup> .  | 46  | July 18, 1894,     | 12,298                 | 2.33   | -                | -      | -     | -      |
| Berkshire County, <sup>6</sup> .  | 47  | July 18, 1894,     | 9,018                  | 1.71   | 8,913            | 1.69   | -     | -      |
| Berkshire County, <sup>7</sup> .  | 82  | Aug. 13, 1894,     | 10,560                 | 2.00   | 10,560           | 2.00   | -     | -      |
| Berkshire County, <sup>8</sup> .  | 83  | Aug. 13, 1894,     | 5,200                  | .99    | 5,188            | .98    | -     | -      |
| Berkshire County, <sup>9</sup> .  | 170 | May 10, 1895,      | 6,289                  | 1.19   | 6,200            | 1.18   | -     | -      |
| Berkshire County, <sup>8</sup> .  | 187 | June 6, 1895,      | 5,300                  | 1.00   | 5,292            | 1.00   | -     | -      |
| Berkshire County, <sup>10</sup> . | 275 | July 25, 1896,     | 5,280                  | 1.00   | -                | -      | -     | -      |
| Berkshire County, <sup>11</sup> . | 276 | July 25, 1896,     | 5,280                  | 1.00   | -                | -      | -     | -      |
| Berkshire County, <sup>12</sup> . | 277 | July 25, 1896,     | 5,260                  | 1.00   | -                | -      | -     | -      |
| Berkshire County, <sup>13</sup> . | 278 | July 25, 1896,     | 5,280                  | 1.00   | -                | -      | -     | -      |
| Berkshire County, <sup>9</sup> .  | 293 | Sept. 21, 1896,    | 8,580                  | 1.62   | 2,704            | .51    | 2,923 | .55    |
| Berkshire County, <sup>9</sup> .  | 330 | Mar. 9, 1897,      | 2,574                  | .48    | -                | -      | -     | -      |
| Berkshire County, <sup>14</sup> . | 415 | April 7, 1898,     | 6,146                  | 1.16   | -                | -      | -     | -      |
| Berkshire County, <sup>15</sup> . | 434 | Oct. 5, 1898,      | 12,900                 | 2.44   | -                | -      | 156   | .03    |
| Berkshire County, <sup>16</sup> . | 435 | Oct. 5, 1898,      | 5,280                  | 1.00   | -                | -      | -     | -      |
| Cheshire, <sup>1</sup> . . . .    | 331 | Mar. 11, 1897,     | 5,260                  | 1.00   | -                | -      | -     | -      |
| Clarksburg, . . . .               | 431 | July 26, 1898,     | 5,280                  | 1.00   | -                | -      | -     | -      |
| Dalton, <sup>17</sup> . . . .     | 26  | June 10, 1894,     | 12,695                 | 2.40   | -                | -      | -     | -      |
| Dalton, <sup>17</sup> . . . .     | 176 | May 14, 1895,      | 6,300                  | 1.20   | 5,459            | 1.03   | -     | -      |
| Dalton, <sup>17</sup> . . . .     | 238 | April 1, 1896,     | 6,190                  | 1.17   | 2,800            | .53    | -     | -      |
| Dalton, <sup>18</sup> . . . .     | 313 | Jan. 29, 1897,     | 3,300                  | .63    | -                | -      | -     | -      |
| Dalton, <sup>18</sup> . . . .     | 340 | May 18, 1897,      | 5,450                  | 1.04   | -                | -      | -     | -      |
| Florida, . . . .                  | 74  | Aug. 1, 1894,      | 26,853                 | 5.09   | -                | -      | -     | -      |
| Great Barrington, <sup>19</sup> . | 82  | -                  | 10,560                 | 2.00   | 10,560           | 2.00   | -     | -      |
| Great Barrington, .               | 267 | June 18, 1896,     | 10,282                 | 1.95   | 4,146            | .79    | -     | -      |
| Hancock, <sup>19</sup> . . . .    | 170 | -                  | 6,289                  | 1.19   | 6,200            | 1.18   | -     | -      |

<sup>1</sup> Duplicate of county petition.<sup>4</sup> North Adams road.<sup>7</sup> See Great Barrington.<sup>10</sup> See Otis.<sup>13</sup> See Lanesborough.<sup>16</sup> See Tyringham.<sup>18</sup> Pittsfield-Springfield road.<sup>2</sup> Cheshire-Savoy road.<sup>5</sup> See Adams.<sup>8</sup> See Lee.<sup>11</sup> See Savoy.<sup>14</sup> See West Stockbridge.<sup>17</sup> Pittsfield-Northampton road.<sup>19</sup> On county petition.<sup>3</sup> Maple Grove road.<sup>6</sup> See North Adams.<sup>9</sup> See Hancock.<sup>12</sup> See Cheshire.<sup>15</sup> See Richmond.



*Berkshire County—Concluded.*

| COUNTY, CITY OR TOWN.               | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |        |        |
|-------------------------------------|-----|--------------------|------------------------|--------|------------------|--------|--------|--------|
|                                     |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898.  |        |
|                                     |     |                    |                        |        | Feet.            | Miles. | Feet.  | Miles. |
| Hancock, <sup>1</sup> . . .         | 293 | - -                | 8,580                  | 1.62   | 2,704            | .51    | 2,923  | .55    |
| Hancock, <sup>1</sup> . . .         | 330 | - -                | 2,574                  | .48    | -                | -      | -      | -      |
| Hinsdale, . . .                     | 156 | April 6, 1895,     | 5,619                  | 1.06   | -                | -      | -      | -      |
| Lee, <sup>1,2</sup> . . .           | 83  | - -                | 5,200                  | .99    | 5,188            | .98    | -      | -      |
| Lee, <sup>1,2</sup> . . .           | 187 | - -                | 5,300                  | 1.00   | 5,292            | 1.00   | -      | -      |
| Lee, <sup>3</sup> . . .             | 252 | May 25, 1896,      | 5,280                  | 1.00   | -                | -      | -      | -      |
| Lee, <sup>4</sup> . . .             | 348 | June 14, 1897,     | 6,762                  | 1.28   | -                | -      | -      | -      |
| Lenox, . . .                        | 178 | May 16, 1895,      | 5,280                  | 1.00   | -                | -      | -      | -      |
| Lenox, . . .                        | 316 | Feb. 7, 1897,      | 6,770                  | 1.28   | -                | -      | -      | -      |
| Lanesborough, <sup>1</sup> . . .    | 278 | - -                | 5,280                  | 1.00   | -                | -      | -      | -      |
| Monterey, . . .                     | 256 | June 5, 1896,      | 5,900                  | 1.12   | -                | -      | -      | -      |
| Mount Washington, . .               | 92  | Oct. 1, 1894,      | 8,300                  | 1.58   | -                | -      | -      | -      |
| North Adams, <sup>1</sup> . . .     | 47  | - -                | 9,018                  | 1.71   | 8,913            | 1.69   | -      | -      |
| North Adams, <sup>5</sup> . . .     | 254 | May 27, 1896,      | 5,742                  | 1.09   | -                | -      | -      | -      |
| North Adams, <sup>5</sup> . . .     | 393 | Dec. 22, 1897,     | 12,436                 | 2.36   | -                | -      | -      | -      |
| Otis, <sup>1</sup> . . .            | 275 | - -                | 5,280                  | 1.00   | -                | -      | -      | -      |
| Pittsfield, <sup>7</sup> . . .      | 78  | Aug. 7, 1894,      | 24,087                 | 4.56   | 5,280            | 1.00   | 2,865  | .54    |
| Pittsfield, <sup>8</sup> . . .      | 259 | June 10, 1896,     | 5,900                  | 1.12   | 4,040            | .76    | -      | -      |
| Richmond, <sup>7</sup> . . .        | 198 | June 4, 1895,      | 10,462                 | 1.98   | -                | -      | -      | -      |
| Richmond, <sup>9</sup> . . .        | 248 | May 9, 1896,       | 5,280                  | 1.00   | 2,500            | .48    | 2,780  | .53    |
| Richmond, <sup>7,1</sup> . . .      | 434 | - -                | 12,900                 | 2.44   | -                | -      | 156    | .03    |
| Savoy, <sup>1</sup> . . .           | 276 | - -                | 5,280                  | 1.00   | -                | -      | -      | -      |
| Stockbridge, . . .                  | 136 | Feb. 26, 1895,     | 10,700                 | 2.02   | -                | -      | -      | -      |
| Tyringham, <sup>1</sup> . . .       | 435 | - -                | 5,280                  | 1.00   | -                | -      | -      | -      |
| West Stockbridge, <sup>10</sup> . . | 166 | Sept. 30, 1895,    | 6,146                  | 1.16   | -                | -      | -      | -      |
| Williamstown, . . .                 | 145 | Mar. 10, 1895,     | 10,576                 | 2.00   | 6,497            | 1.23   | 3,650  | .69    |
| Windsor, . . .                      | 36  | July 12, 1894,     | 42,787                 | 8.10   | 1,501            | .28    | -      | -      |
| Totals, . . .                       | .   | .                  | 424,763                | 80.49  | 74,080           | 14.03  | 12,374 | 2.34   |

Forty-six petitions (fifteen county, five city and twenty-six town), in two cities and twenty-two towns.

Average distance petitioned for, 9,234 feet (1.75 miles).

Twenty-seven lay-outs, in two cities and eight towns.

Laid out on county petitions, 41,936 feet (7.94 miles).

Laid out on city petitions, 12,185 feet (2.31 miles).

Laid out on town petitions, 32,333 feet (6.12 miles).

Total length laid out, 86,454 feet (16.37 miles); average, 3,202 feet (.61 mile).

Percentage of length laid out to distance petitioned for, 20.34.

<sup>1</sup> On county petition.

<sup>2</sup> Becket road.

<sup>3</sup> South Lee road.

<sup>4</sup> Lenox road.

<sup>5</sup> Williamstown road.

<sup>6</sup> West Main Street.

<sup>7</sup> Hancock road.

<sup>8</sup> Dalton road.

East road to Pittsfield.

<sup>10</sup> Duplicate of county petition.

*Bristol County.*

| COUNTY, CITY OR TOWN.              | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|------------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                    |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                    |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Acushnet, <sup>1</sup> . . .       | 96  | Oct. 24, 1894,     | 35,500                 | 6.73   | 3,363            | .64    | -     | -      |
| Acushnet, <sup>2</sup> . . .       | 97  | Oct. 24, 1894,     | 6,326                  | 1.20   | -                | -      | -     | -      |
| Attleborough, <sup>3</sup> . . .   | 183 | May 29, 1895,      | 14,153                 | 2.68   | -                | -      | -     | -      |
| Attleborough, <sup>4</sup> . . .   | 184 | May 29, 1895,      | 5,112                  | .97    | -                | -      | -     | -      |
| Attleborough, <sup>5</sup> . . .   | 268 | June 18, 1896,     | 14,246                 | 2.70   | -                | -      | -     | -      |
| Berkley, . . .                     | 281 | Aug. 3, 1896,      | 22,728                 | 4.30   | -                | -      | -     | -      |
| Bristol County, <sup>6</sup> . . . | 53  | July 24, 1894,     | 48,070                 | 9.11   | 18,866           | 3.57   | 6,568 | 1.24   |
| Dartmouth, <sup>7</sup> . . .      | 22  | July 9, 1894,      | 24,000                 | 4.55   | -                | -      | 2,975 | .56    |
| Dighton, <sup>8</sup> . . .        | 150 | Mar. 26, 1895,     | 24,576                 | 4.65   | -                | -      | -     | -      |
| Dighton, <sup>9</sup> . . .        | 226 | Jan. 2, 1896,      | 8,261                  | 1.56   | -                | -      | -     | -      |
| Easton, <sup>10</sup> . . .        | 139 | Mar. 1, 1895,      | 39,000                 | 7.39   | -                | -      | -     | -      |
| Easton, <sup>11</sup> . . .        | 365 | Sept. 2, 1897,     | 4,300                  | .81    | -                | -      | -     | -      |
| Fairhaven, . . .                   | 31  | July 10, 1894,     | 20,100                 | 3.80   | 7,653            | 1.45   | -     | -      |
| Freetown, . . .                    | 314 | Feb. 3, 1897,      | 16,850                 | 3.20   | -                | -      | -     | -      |
| Mansfield, . . .                   | 341 | Apr. 8, 1897,      | 5,121                  | .97    | -                | -      | -     | -      |
| New Bedford, . . .                 | 191 | June 18, 1895,     | 2,950                  | .56    | -                | -      | -     | -      |
| North Attleborough, . .            | 18  | July 5, 1894,      | 25,550                 | 4.83   | 16,979           | 3.21   | -     | -      |
| Raynham, . . .                     | 134 | Feb. 23, 1895,     | 23,000                 | 4.36   | -                | -      | -     | -      |
| Rehoboth, . . .                    | 132 | Feb. 20, 1895,     | 29,186                 | 5.53   | 8,193            | 1.55   | -     | -      |
| Seekonk, . . .                     | 127 | Feb. 6, 1895,      | 14,591                 | 2.76   | -                | -      | -     | -      |
| Somerset, . . .                    | 147 | Mar. 30, 1895,     | 29,800                 | 5.64   | 10,830           | 2.05   | -     | -      |
| Swansea, . . .                     | 235 | Mar. 10, 1896,     | 36,515                 | 6.92   | -                | -      | -     | -      |
| Taunton, <sup>12</sup> . . .       | 171 | May 11, 1895,      | 25,864                 | 4.89   | -                | -      | -     | -      |
| Taunton, <sup>9,13</sup> . . .     | 179 | May 16, 1895,      | 23,752                 | 4.50   | 6,300            | 1.20   | 3,170 | .60    |
| Taunton, <sup>14,15</sup> . . .    | 180 | May 19, 1895,      | 13,200                 | 2.50   | -                | -      | -     | -      |
| Westport, <sup>16</sup> . . .      | 53  | - -                | 24,070                 | 4.56   | 18,866           | 3.57   | 3,593 | .68    |
| Totals, . . .                      | .   | .                  | 482,385                | 91.36  | 72,184           | 13.67  | 9,738 | 1.84   |

Twenty-five petitions (one county, four city, twenty town), in two cities and sixteen towns.

Average distance petitioned for, 12,060 feet (2.29 miles).

Twenty-one lay-outs, in one city and seven towns.

Laid out on county petitions, 25,434 feet (4.81 miles).

Laid out on city petitions, 9,470 feet (1.80 miles).

Laid out on town petitions, 47,018 feet (8.90 miles).

Total length laid out, 81,922 feet (15.51 miles); average, 3,901 feet (.74 mile).

Percentage of length laid out to length petitioned for, 16.98.

<sup>1</sup> New Bedford-Boston road.

<sup>3</sup> Washington Street (turnpike).

<sup>5</sup> Washington and Horton streets.

<sup>7</sup> Duplicate of county petition.

<sup>9</sup> Taunton-Providence road.

<sup>11</sup> Brockton-Mansfield road.

<sup>13</sup> Winthrop Street.

<sup>15</sup> No plan; distance scaled on map.

<sup>2</sup> Fairhaven road.

<sup>4</sup> North Avenue.

<sup>6</sup> See Dartmouth and Westport.

<sup>8</sup> Taunton-Fall River road.

<sup>10</sup> Boston-Taunton road.

<sup>12</sup> Somerset Avenue and Dean Street.

<sup>14</sup> Broadway (Boston-Taunton road).

<sup>16</sup> On county petition.

*County of Dukes County.*

| COUNTY, CITY OR TOWN.            | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|----------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                  |     |                    |                        |        | 1894-97.         |        | 1898. |        |
|                                  |     |                    | Feet.                  | Miles. | Feet.            | Miles. | Feet. | Miles. |
| Chilmark, . . .                  | 12  | July 3, 1894,      | 41,237                 | 7.81   | -                | -      | -     | -      |
| Cottage City, <sup>1</sup> . . . | 7   | - -                | 13,117                 | 2.48   | 12,538           | 2.37   | -     | -      |
| Cottage City, <sup>1</sup> . . . | 335 | - -                | 2,150                  | .41    | -                | -      | -     | -      |
| Dukes County, <sup>2</sup> . . . | 7   | July 2, 1894,      | 26,217                 | 4.96   | 12,538           | 2.37   | -     | -      |
| Dukes County, <sup>3</sup> . . . | 335 | Mar. 27, 1897,     | 6,919                  | 1.31   | -                | -      | -     | -      |
| Edgartown, <sup>1</sup> . . .    | 7   | - -                | 13,100                 | 2.48   | 1,705            | .33    | -     | -      |
| Tisbury, . . .                   | 3   | June 28, 1894,     | 10,609                 | 2.01   | 10,194           | 1.93   | -     | -      |
| Tisbury, <sup>1</sup> . . .      | 335 | - -                | 4,769                  | .90    | -                | -      | -     | -      |
| West Tisbury, . . .              | 4   | June 28, 1894,     | 28,441                 | 5.39   | 15,000           | 2.84   | -     | -      |
| West Tisbury, <sup>4</sup> . . . | 244 | May 29, 1896,      | 6,912                  | 1.18   | -                | -      | -     | -      |
| Totals, . . .                    | .   | .                  | 119,635                | 22.66  | 39,437           | 7.47   | -     | -      |

Six petitions (two county, four town), in five towns.

Average distance petitioned for, 19,939 feet (3.78 miles).

Eight lay-outs, in four towns.

Laid out on county petition, 14,243 feet (2.70 miles).

Laid out on town petitions, 25,194 feet (4.77 miles).

Total length laid out, 39,437 feet (7.47 miles); average, 4,930 feet (.93 mile).

Percentage of length laid out to length petitioned for, 32.96.

<sup>1</sup> On county petition.

<sup>2</sup> See Cottage City and Edgartown.

<sup>3</sup> See Cottage City and Tisbury.

<sup>4</sup> Petition for change of location.

*Essex County.*

| COUNTY, CITY OR TOWN.           | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|---------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                 |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                 |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Amesbury, . . .                 | 203 | July 22, 1895,     | 27,977                 | 5.30   | -                | -      | -     | -      |
| Andover, <sup>1</sup> . . .     | 20  | July 6, 1894,      | 31,400                 | 5.95   | 8,936            | 1.70   | -     | -      |
| Andover, <sup>2,3</sup> . . .   | 436 | - -                | 21,750                 | 4.12   | -                | -      | -     | -      |
| Andover, <sup>3,4</sup> . . .   | 442 | Dec. 18, 1898,     | 25,080                 | 4.75   | -                | -      | -     | -      |
| Andover, <sup>5</sup> . . .     | 443 | Dec. 18, 1898,     | 21,750                 | 4.12   | -                | -      | -     | -      |
| Beverly, <sup>2</sup> . . .     | 64  | - -                | 13,900                 | 2.64   | 7,813            | 1.47   | 2,800 | .53    |
| Boxford, . . .                  | 395 | Dec. 23, 1897,     | 25,125                 | 4.76   | -                | -      | -     | -      |
| Danvers, . . .                  | 351 | June 29, 1897,     | 6,267                  | 1.18   | -                | -      | -     | -      |
| Essex, . . .                    | 364 | Aug. 3, 1897,      | 22,412                 | 4.24   | -                | -      | -     | -      |
| Essex County, <sup>6</sup> . .  | 64  | July 30, 1894,     | 53,800                 | 10.19  | 11,007           | 2.09   | 2,800 | .53    |
| Essex County, <sup>7</sup> . .  | 436 | Oct. 26, 1898,     | 29,670                 | 5.62   | -                | -      | -     | -      |
| Georgetown, . . .               | 390 | Dec. 16, 1897,     | 16,800                 | 3.18   | -                | -      | -     | -      |
| Gloucester, <sup>8</sup> . . .  | 28  | July 10, 1894,     | 9,650                  | 1.83   | 8,452            | 1.60   | 1,198 | .23    |
| Gloucester, <sup>9</sup> . . .  | 110 | Jan. 1, 1895,      | 54,120                 | 10.25  | -                | -      | -     | -      |
| Gloucester, <sup>8</sup> . . .  | 380 | Apr. 5, 1897,      | 8,528                  | 1.62   | -                | -      | 3,446 | .65    |
| Groveland, . . .                | 211 | Aug. 8, 1895,      | 23,948                 | 4.53   | -                | -      | -     | -      |
| Hamilton, <sup>2</sup> . . .    | 64  | - -                | 18,100                 | 3.43   | -                | -      | -     | -      |
| Haverhill, . . .                | 297 | Nov. 4, 1896,      | 13,888                 | 2.63   | -                | -      | -     | -      |
| Ipswich, <sup>2,10</sup> . . .  | 64  | - -                | 12,700                 | 2.40   | -                | -      | -     | -      |
| Ipswich, <sup>11</sup> . . .    | 239 | Apr. 4, 1896,      | 11,900                 | 2.25   | -                | -      | -     | -      |
| Lawrence, <sup>12</sup> . . .   | 76  | Aug. 2, 1894,      | 2,640                  | .50    | -                | -      | -     | -      |
| Lawrence, <sup>13</sup> . . .   | 245 | May 4, 1896,       | 4,660                  | .88    | -                | -      | -     | -      |
| Lawrence, <sup>12</sup> . . .   | 284 | Aug. 25, 1896,     | 2,300                  | .44    | -                | -      | -     | -      |
| Lawrence, <sup>14</sup> . . .   | 285 | Aug. 25, 1896,     | 1,750                  | .33    | -                | -      | -     | -      |
| Lawrence, <sup>15</sup> . . .   | 290 | Sept. 11, 1896,    | 1,408                  | .27    | 1,408            | .27    | -     | -      |
| Lawrence, <sup>2,16</sup> . . . | 436 | - -                | 7,920                  | 1.50   | -                | -      | -     | -      |
| Lynn, . . .                     | 342 | May 20, 1897,      | 9,120                  | 1.73   | -                | -      | -     | -      |
| Manchester, . . .               | 167 | May 1, 1895,       | 5,280                  | 1.00   | -                | -      | -     | -      |
| Merrimac, . . .                 | 204 | July 26, 1895,     | 15,134                 | 2.87   | 2,959            | .56    | 1,588 | .30    |

<sup>1</sup> Boston-Lawrence road.<sup>3</sup> Lowell-Lawrence road.<sup>5</sup> Tewksbury road.<sup>7</sup> See Lawrence and Andover.<sup>9</sup> Essex Avenue, Washington Street and Rockport road.<sup>11</sup> North of arch bridge.<sup>13</sup> South Broadway.<sup>15</sup> Jackson Street.<sup>2</sup> On county petition.<sup>4</sup> Duplicate of county petition.<sup>6</sup> See Beverly, Wenham, Hamilton and Ipswich.<sup>8</sup> Western Avenue.<sup>10</sup> South of arch bridge.<sup>12</sup> Haverhill Street.<sup>14</sup> Prospect Street.<sup>16</sup> Lowell road, south.



## Essex County — Concluded.

| COUNTY, CITY OR TOWN.             | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |        |        |
|-----------------------------------|-----|--------------------|------------------------|--------|------------------|--------|--------|--------|
|                                   |     |                    |                        |        | 1894-97.         |        | 1898.  |        |
|                                   |     |                    | Feet.                  | Miles. | Feet.            | Miles. | Feet.  | Miles. |
| Methuen, <sup>1</sup> . . .       | 287 | Aug. 31, 1896,     | 20,184                 | 3.82   | 5,478            | 1.04   | -      | -      |
| Methuen, <sup>2</sup> . . .       | 387 | Dec. 8, 1897,      | 5,280                  | 1.00   | -                | -      | -      | -      |
| Middleton, . . .                  | 347 | June 12, 1897,     | 26,501                 | 5.02   | -                | -      | -      | -      |
| Newbury, <sup>3</sup> . . .       | 197 | July 2, 1895,      | 22,238                 | 4.24   | -                | -      | -      | -      |
| Newbury, <sup>4</sup> . . .       | 410 | Mar. 7, 1898,      | 23,133                 | 4.38   | -                | -      | -      | -      |
| Newburyport, <sup>5</sup> . . .   | 196 | July 1, 1895,      | 10,100                 | 1.91   | 4,659            | .88    | 4,600  | .87    |
| Newburyport, <sup>4</sup> . . .   | 417 | Apr. 22, 1898,     | 2,700                  | .51    | -                | -      | -      | -      |
| North Andover, . . .              | 274 | July 1, 1896,      | 10,186                 | 1.93   | -                | -      | -      | -      |
| Peabody, <sup>6</sup> . . .       | 352 | July 1, 1897,      | 5,280                  | 1.00   | -                | -      | -      | -      |
| Peabody, <sup>7</sup> . . .       | 353 | July 1, 1897,      | 12,120                 | 2.30   | -                | -      | -      | -      |
| Rockport, . . .                   | 135 | Feb. 23, 1895,     | 5,736                  | 1.08   | -                | -      | -      | -      |
| Rowley, . . .                     | 242 | Apr. 23, 1896,     | 19,270                 | 3.65   | -                | -      | -      | -      |
| Salisbury, <sup>8</sup> . . .     | 243 | Apr. 27, 1896,     | 10,560                 | 2.00   | -                | -      | -      | -      |
| Salisbury, <sup>9</sup> . . .     | 405 | Feb. 11, 1898,     | 11,500                 | 2.18   | -                | -      | -      | -      |
| Saugus, . . .                     | 34  | July 11, 1894,     | 8,811                  | 1.67   | -                | -      | 8,444  | 1.60   |
| Swampscott, . . .                 | 375 | Oct. 14, 1897,     | 8,780                  | 1.66   | 5,449            | 1.03   | -      | -      |
| Topsfield, . . .                  | 383 | Nov. 27, 1897,     | 26,031                 | 4.95   | -                | -      | -      | -      |
| Wenham, . . .                     | 64  | -                  | 9,100                  | 1.73   | 3,194            | .61    | -      | -      |
| West Newbury, <sup>5</sup> . . .  | 101 | Nov. 26, 1894,     | 27,017                 | 5.11   | 11,731           | 2.22   | -      | -      |
| West Newbury, <sup>10</sup> . . . | 206 | July 25, 1895,     | 4,000                  | .76    | -                | -      | -      | -      |
| Totals, . . .                     | .   | .                  | 684,304                | 129.60 | 60,079           | 11.38  | 22,076 | 4.18   |

Forty-three petitions (two county, twelve city and twenty-nine town), in six cities and twenty-four towns.

Average distance petitioned for, 15,914 feet (3.01 miles).

Twenty-two lay-outs, in four cities and seven towns.

Laid out on county petitions, 13,807 feet (2.62 miles).

Laid out on city petitions, 23,763 feet (4.49 miles).

Laid out on town petitions, 44,585 feet (8.45 miles).

Total length laid out, 82,155 feet (15.56 miles).

Average, 3,734 feet (.71 mile).

Percentage of length laid out to distance petitioned for, 12.01.

<sup>1</sup> Haverhill road.

<sup>2</sup> Lowell road.

<sup>3</sup> Boston-Newburyport road, *via* Oldtown.

<sup>4</sup> Boston-Newburyport road, *via* Turnpike.

<sup>5</sup> Newburyport-Haverhill road.

<sup>6</sup> From Lynn line; Washington and Lynn streets.

<sup>7</sup> From Danvers line; Sylvan and Andover streets.

<sup>8</sup> Newburyport road.

<sup>9</sup> Haverhill road.

<sup>10</sup> Proposed relocation at Pipe Stave Hill.



*Franklin County.*

| COUNTY, CITY OR TOWN.               | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |        |        |
|-------------------------------------|-----|--------------------|------------------------|--------|------------------|--------|--------|--------|
|                                     |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898.  |        |
|                                     |     |                    |                        |        | Feet.            | Miles. | Feet.  | Miles. |
| Ashfield, <sup>1</sup> . . .        | 195 | June 26, 1895,     | 5,300                  | 1.00   | -                | -      | -      | -      |
| Ashfield, <sup>2</sup> . . .        | 367 | Sept. 18, 1897,    | 3,900                  | 1.70   | 3,907            | .74    | 4,585  | .87    |
| Buckland, <sup>3,4</sup> . . .      | 38  | July 14, 1894,     | 1,152                  | .22    | 796              | .15    | -      | -      |
| Buckland, <sup>4</sup> . . .        | 112 | Jan. 5, 1895,      | 5,280                  | 1.00   | 5,308            | 1.01   | -      | -      |
| Buckland, <sup>4</sup> . . .        | 224 | Dec. 28, 1895,     | 5,280                  | 1.00   | 5,325            | 1.01   | -      | -      |
| Buckland, <sup>4</sup> . . .        | 315 | Feb. 15, 1896,     | 5,274                  | 1.00   | -                | -      | 1,924  | .36    |
| Charlemont, . . .                   | 120 | Jan. 18, 1895,     | 7,500                  | 1.42   | 2,040            | .39    | 1,326  | .25    |
| Charlemont, . . .                   | 450 | Dec. 24, 1898,     | 34,320                 | 6.50   | -                | -      | -      | -      |
| Colrain, <sup>3</sup> . . .         | 43  | July 17, 1894,     | 1,062                  | .20    | -                | -      | -      | -      |
| Colrain, . . .                      | 133 | Feb. 20, 1895,     | 12,438                 | 2.36   | -                | -      | 5,679  | 1.08   |
| Colrain, . . .                      | 432 | Aug. 2, 1898,      | 17,060                 | 3.23   | -                | -      | -      | -      |
| Conway, . . .                       | 215 | Sept. 4, 1895,     | 14,147                 | 2.68   | -                | -      | -      | -      |
| Deerfield, <sup>5,6</sup> . . .     | 24  | -                  | 9,400                  | 1.79   | 8,093            | 1.53   | -      | -      |
| Deerfield, <sup>7</sup> . . .       | 329 | Mar. 10, 1897,     | 36,960                 | 7.00   | -                | -      | -      | -      |
| Erving, . . .                       | 152 | Mar. 29, 1895,     | 10,717                 | 2.03   | -                | -      | 4,213  | .80    |
| Franklin County, <sup>8</sup> . . . | 24  | July 9, 1894,      | 69,170                 | 13.10  | 32,823           | 6.22   | 4,213  | .80    |
| Gill, . . .                         | 130 | Feb. 7, 1895,      | 10,520                 | 1.99   | -                | -      | -      | -      |
| Greenfield, <sup>9</sup> . . .      | 188 | June 10, 1895,     | 23,700                 | 4.49   | -                | -      | -      | -      |
| Greenfield, <sup>10</sup> . . .     | 332 | Mar. 23, 1897,     | 6,722                  | 1.27   | -                | -      | -      | -      |
| Greenfield, <sup>11</sup> . . .     | 397 | Dec. 23, 1897,     | 5,300                  | 1.00   | -                | -      | -      | -      |
| Montague, <sup>12</sup> . . .       | 304 | Dec. 18, 1896,     | 10,560                 | 2.00   | -                | -      | -      | -      |
| Montague, <sup>13</sup> . . .       | 359 | July 11, 1897,     | 6,587                  | 1.25   | -                | -      | 5,761  | 1.09   |
| Montague, <sup>14</sup> . . .       | 360 | July 11, 1897,     | 8,305                  | 1.57   | -                | -      | -      | -      |
| New Salem, . . .                    | 258 | June 8, 1896,      | 27,300                 | 5.17   | -                | -      | -      | -      |
| Northfield, . . .                   | 422 | June 8, 1898,      | 15,840                 | 3.00   | -                | -      | -      | -      |
| Orange, <sup>5</sup> . . .          | 6   | July 2, 1894,      | 30,550                 | 5.74   | 11,544           | 2.19   | -      | -      |
| Orange, <sup>5</sup> . . .          | 103 | Dec. 10, 1894,     | 5,280                  | 1.00   | -                | -      | -      | -      |
| Orange, <sup>5</sup> . . .          | 301 | Nov. 27, 1896,     | 2,300                  | .43    | -                | -      | -      | -      |
| Shelburne, <sup>15</sup> . . .      | 35  | July 11, 1894,     | 12,138                 | 2.30   | 11,398           | 2.16   | -      | -      |
| Shelburne, <sup>16</sup> . . .      | 227 | Jan. 13, 1896,     | 5,300                  | 1.00   | -                | -      | -      | -      |
| Sunderland, . . .                   | 52  | July 24, 1894,     | 4,151                  | .80    | 992              | .17    | -      | -      |
| Sunderland, . . .                   | 402 | Jan. 11, 1898,     | 5,280                  | 1.00   | -                | -      | -      | -      |
| Whately, <sup>17</sup> . . .        | 325 | Feb. 28, 1897,     | 5,400                  | 1.02   | -                | -      | -      | -      |
| Whately, <sup>18</sup> . . .        | 408 | Feb. 11, 1898,     | 5,300                  | 1.00   | -                | -      | -      | -      |
| Totals, . . .                       | .   | .                  | 349,521                | 66.20  | 49,403           | 9.35   | 23,488 | 4.45   |

Thirty-three petitions (one county and thirty-two town), in sixteen towns.

Average distance petitioned for, 10,590 feet (2.01 miles).

Twenty-six lay-outs, in ten towns.

Laid out on county petitions, 37,036 feet (7.02 miles).

Laid out on town petitions, 35,855 feet (6.72).

Total length laid out, 72,891 feet (13.80 miles); average, 2,804 feet (.53 mile).

Percentage of length laid out to distance petitioned for, 20.85.

<sup>1</sup> Shelburne Falls road.

<sup>2</sup> Duplicate of county petition.

<sup>3</sup> On county petition.

<sup>4</sup> Greenfield-Northampton road.

<sup>5</sup> Bernardston road.

<sup>6</sup> Shelburne road.

<sup>7</sup> Miller's Falls road *via* Pipe line.

<sup>8</sup> Colrain road.

<sup>9</sup> Hatfield road.

<sup>2</sup> Shelburne Falls road, relocation.

<sup>4</sup> Ashfield road.

<sup>6</sup> Sunderland road.

<sup>8</sup> See Buckland, Colrain, Deerfield, Erving,

Orange, Shelburne and Sunderland.

<sup>10</sup> Deerfield road.

<sup>12</sup> Miller's Falls road *via* Ferry road.

<sup>14</sup> Miller's Falls road *via* L Street.

<sup>16</sup> Greenfield road.

<sup>18</sup> Deerfield road.

*Hampden County.*

| COUNTY, CITY OR TOWN.             | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|-----------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                   |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                   |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Blandford, <sup>1</sup> . . .     | 216 | Sept. 7, 1895,     | 13,337                 | 2.84   | -                | -      | -     | -      |
| Blandford, <sup>2</sup> . . .     | 321 | Feb. 23, 1897,     | 13,858                 | 2.63   | -                | -      | -     | -      |
| Brimfield, <sup>3</sup> . . .     | 40  | July 6, 1894,      | 36,370                 | 6.89   | 6,160            | 1.17   | -     | -      |
| Brimfield, <sup>4,5</sup> . . .   | 131 | -                  | 9,355                  | 1.77   | -                | -      | -     | -      |
| Chester, <sup>6,7</sup> . . .     | 104 | Dec. 11, 1894,     | 5,280                  | 1.00   | -                | -      | -     | -      |
| Chester, <sup>8,7</sup> . . .     | 426 | June 23, 1898,     | 5,280                  | 1.00   | -                | -      | -     | -      |
| Chester, <sup>9</sup> . . .       | 441 | Dec. 16, 1898,     | 34,950                 | 6.62   | -                | -      | -     | -      |
| Chicopee, . . .                   | 223 | Dec. 28, 1895,     | 5,700                  | 1.08   | 3,042            | .58    | 1,510 | .29    |
| East Longmeadow, .                | 202 | July 11, 1895,     | 25,426                 | 4.81   | -                | -      | -     | -      |
| Granville, . . .                  | 87  | Sept. 6, 1894,     | 9,216                  | 1.75   | -                | -      | -     | -      |
| Hampden, . . .                    | 201 | July 11, 1895,     | 18,031                 | 3.41   | -                | -      | -     | -      |
| Hampden County, <sup>8</sup> .    | 19  | July 6, 1894,      | 100,480                | 19.03  | 40,019           | 7.58   | 8,335 | 1.58   |
| Hampden County, <sup>9</sup> .    | 131 | Feb. 12, 1895,     | 90,064                 | 17.06  | 5,276            | 1.00   | -     | -      |
| Hampden County, <sup>10</sup> .   | 241 | Apr. 23, 1896,     | 2,400                  | .46    | -                | -      | -     | -      |
| Hampden County, <sup>11</sup> .   | 273 | July 3, 1896,      | 5,300                  | 1.00   | -                | -      | -     | -      |
| Holyoke, <sup>4</sup> . . .       | 273 | -                  | 5,300                  | 1.00   | -                | -      | -     | -      |
| Longmeadow, . . .                 | 333 | Mar. 24, 1897,     | 5,400                  | 1.02   | -                | -      | -     | -      |
| Ludlow, . . .                     | 236 | Mar. 11, 1896,     | 14,831                 | 2.80   | -                | -      | -     | -      |
| Monson, <sup>12</sup> . . .       | 57  | July 26, 1894,     | 14,960                 | 2.83   | 4,933            | .93    | -     | -      |
| Monson, <sup>4,5</sup> . . .      | 131 | -                  | 6,925                  | 1.31   | -                | -      | -     | -      |
| Palmer, <sup>4</sup> . . .        | 131 | -                  | 46,034                 | 8.72   | -                | -      | -     | -      |
| Russell, <sup>4</sup> . . .       | 19  | -                  | 35,380                 | 6.70   | 22,270           | 4.21   | 5,605 | 1.06   |
| Wales, . . .                      | 41  | July 16, 1894,     | 25,922                 | 4.91   | -                | -      | -     | -      |
| Westfield, <sup>4</sup> . . .     | 19  | -                  | 40,900                 | 7.75   | 9,695            | 1.84   | 2,730 | .52    |
| West Springfield, <sup>13</sup> . | 113 | Jan. 8, 1895,      | 24,200                 | 5.58   | 8,054            | 1.53   | -     | -      |
| West Springfield, <sup>4</sup> .  | 241 | -                  | 2,400                  | .46    | -                | -      | -     | -      |
| Wilbraham, <sup>4</sup> . . .     | 131 | -                  | 27,750                 | 5.26   | 5,998            | 1.14   | -     | -      |
| Wilbraham, . . .                  | 247 | May 8, 1896,       | 4,140                  | .78    | 4,140            | .78    | -     | -      |
| Totals, . . .                     | .   | .                  | 420,385                | 79.62  | 64,292           | 12.18  | 9,845 | 1.87   |

Twenty petitions (four county, one city and fifteen town), in two cities and fifteen towns.

Average distance petitioned for, 21,019 feet (3.98 miles).

Twenty-five lay-outs, in one city and six towns.

Laid out on county petitions, 48,354 feet (9.16 miles).

Laid out on city petitions, 4,552 feet (.87 mile).

Laid out on town petitions, 21,231 feet (4.02 miles).

Total length laid out, 74,137 feet (14.05 miles).

Percentage of length laid out to length petitioned for, 17.65.

<sup>1</sup> Huntington road.

<sup>2</sup> Russell road.

<sup>3</sup> Road to Brimfield Centre.

<sup>4</sup> On county petition.

<sup>5</sup> River road.

<sup>6</sup> Springfield-Pittsfield road.

<sup>7</sup> Covered by subsequent petition.

<sup>8</sup> See Westfield, Russell and W. Springfield.

<sup>9</sup> See Wilbraham, Palmer, Monson and Brimfield.

<sup>10</sup> See W. Springfield; Agawam road.

<sup>11</sup> See Holyoke-Springfield road.

<sup>12</sup> Palmer road.

<sup>13</sup> Duplicate of county petition.

*Hampshire County.*

| COUNTY, CITY OR TOWN.               | No. | Petition Received. | LENGTH PETITIONED FOR. |       | LENGTH LAID OUT. |        |        |        |
|-------------------------------------|-----|--------------------|------------------------|-------|------------------|--------|--------|--------|
|                                     |     |                    | Feet.                  | Miles | 1894-97.         |        | 1898.  |        |
|                                     |     |                    |                        |       | Feet.            | Miles. | Feet.  | Miles. |
| Amherst, . . . . .                  | 181 | May 18, 1895,      | 5,356                  | 1.02  | -                | -      | -      | -      |
| Belchertown, <sup>1</sup> . . . .   | 220 | Nov. 18, 1895,     | 5,280                  | 1.00  | -                | -      | -      | -      |
| Belchertown, <sup>1</sup> . . . .   | 282 | Aug. 6, 1896,      | 5,280                  | 1.00  | -                | -      | -      | -      |
| Chesterfield, <sup>2</sup> . . . .  | 128 | Feb. 6, 1895,      | 3,930                  | .74   | -                | -      | -      | -      |
| Cummington, <sup>2</sup> . . . .    | 27  | July 10, 1894,     | 55,053                 | 10.43 | -                | -      | -      | -      |
| Easthampton, <sup>3</sup> . . . .   | 114 | Jan. 10, 1895,     | 5,854                  | 1.11  | -                | -      | -      | -      |
| Easthampton, <sup>2,4</sup> . . .   | 189 | July 10, 1895,     | 6,800                  | 1.29  | 6,963            | 1.32   | -      | -      |
| Enfield, . . . . .                  | 283 | Aug. 25, 1896,     | 9,593                  | 1.81  | -                | -      | -      | -      |
| Goshen, <sup>2</sup> . . . . .      | 2   | June 28, 1894,     | 29,480                 | 5.58  | 10,058           | 1.91   | -      | -      |
| Granby, <sup>5</sup> . . . . .      | 5   | -                  | 3,347                  | .63   | 3,347            | .63    | -      | -      |
| Granby, . . . . .                   | 289 | Sept. 9, 1896,     | 10,700                 | 2.03  | -                | -      | -      | -      |
| Greenwich, . . . . .                | 295 | Oct. 17, 1896,     | 5,464                  | 1.03  | -                | -      | -      | -      |
| Hadley, <sup>2,4</sup> . . . . .    | 94  | Oct. 20, 1894,     | 5,667                  | 1.08  | 5,676            | 1.08   | -      | -      |
| Hadley, <sup>4</sup> . . . . .      | 200 | July 11, 1895,     | 4,133                  | .78   | 3,683            | .70    | 450    | .08    |
| Hadley, <sup>4</sup> . . . . .      | 286 | Aug. 27, 1896,     | 14,766                 | 2.80  | -                | -      | 2,001  | .38    |
| Hampshire County, <sup>6</sup> .    | 5   | June 29, 1894,     | 154,192                | 29.19 | 38,746           | 7.33   | 4,444  | .85    |
| Hatfield, <sup>7</sup> . . . . .    | 164 | Apr. 23, 1895,     | 2,500                  | .47   | -                | -      | -      | -      |
| Hatfield, <sup>8</sup> . . . . .    | 165 | Apr. 23, 1895,     | 5,280                  | 1.00  | -                | -      | -      | -      |
| Huntington, . . . . .               | 99  | Nov. 24, 1894,     | 14,408                 | 2.73  | 5,336            | 1.01   | -      | -      |
| Middlefield, . . . . .              | 177 | May 14, 1895,      | 5,400                  | 1.03  | -                | -      | -      | -      |
| Northampton, <sup>2,9</sup> . . .   | 67  | July 31, 1894,     | 2,997                  | .56   | 2,997            | .56    | -      | -      |
| Northampton, <sup>2,10</sup> . . .  | 194 | June 25, 1895,     | 5,280                  | 1.00  | 1,753            | .33    | 1,417  | .27    |
| South Hadley, <sup>6</sup> . . . .  | 5   | -                  | 15,571                 | 2.95  | 4,852            | .92    | 3,027  | .57    |
| South Hadley, <sup>2</sup> . . . .  | 288 | Sept. 3, 1896,     | 8,816                  | 1.67  | -                | -      | -      | -      |
| Southampton, . . . .                | 253 | May 25, 1896,      | 5,280                  | 1.00  | -                | -      | -      | -      |
| Ware, . . . . .                     | 205 | July 29, 1895,     | 4,100                  | .77   | 1,788            | .34    | -      | -      |
| Williamsburg, <sup>5</sup> . . . .  | 5   | -                  | 26,063                 | 4.94  | 3,100            | .58    | -      | -      |
| Williamsburg, <sup>2,11</sup> . . . | 129 | Feb. 6, 1895,      | 11,908                 | 2.26  | -                | -      | -      | -      |
| Williamsburg, <sup>2,12</sup> . . . | 249 | May 11, 1896,      | 5,695                  | 1.08  | -                | -      | -      | -      |
| Williamsburg, <sup>13</sup> . . . . | 411 | Mar. 17, 1898,     | 6,036                  | 1.14  | -                | -      | 6,036  | 1.14   |
| Williamsburg, <sup>2,12</sup> . . . | 439 | Dec. 12, 1898,     | 4,700                  | .89   | -                | -      | -      | -      |
| Totals, . . . . .                   |     |                    | 263,618                | 49.93 | 49,553           | 9.38   | 12,931 | 2.45   |

Twenty-eight petitions (one county, two city and twenty-five town), in one city and seventeen towns.

Average distance petitioned for, 9,415 feet (1.78 miles).

Twenty-one lay-outs, in one city and eight towns.

Laid out on county petitions, 43,190 feet (8.18 miles).

Laid out on city petitions, 2,997 feet (.56 mile).

Laid out on town petitions, 16,297 feet (3.09 miles).

Total length laid out, 62,484 feet (11.83 miles); average, 2,976 feet (.56 mile).

Percentage of length laid out to distance petitioned for, 23.69.

<sup>1</sup> Granby road.

<sup>2</sup> Duplicate of county petition. <sup>3</sup> Holyoke Street.

<sup>4</sup> Northampton road.

<sup>5</sup> On county petition.

<sup>6</sup> See Chesterfield, Cummington, Easthampton, Goshen, Granby, Hadley, Northampton, South Hadley and Williamsburg.

<sup>8</sup> Road to Hatfield village.

<sup>9</sup> Bridge Street.

<sup>10</sup> Easthampton road,

<sup>11</sup> Chesterfield road.

<sup>12</sup> Goshen road.

<sup>13</sup> Relocation Goshen road.

*Middlesex County.*

| COUNTY, CITY OR TOWN.              | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|------------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                    |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                    |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Acton, <sup>1</sup> . . . .        | 119 | Jan. 7, 1895,      | 9,158                  | 1.73   | -                | -      | -     | -      |
| Acton, <sup>1</sup> . . . .        | 138 | Feb. 28, 1895,     | 12,129                 | 2.30   | -                | -      | -     | -      |
| Acton, <sup>2,3</sup> . . . .      | 233 | - -                | 21,922                 | 4.15   | -                | -      | -     | -      |
| Acton, <sup>3,4</sup> . . . .      | 413 | - -                | 29,400                 | 5.57   | -                | -      | -     | -      |
| Ashby, . . . .                     | 1   | June 27, 1894,     | 18,625                 | 3.53   | 12,936           | 2.46   | 3,602 | .68    |
| Ashland, <sup>5</sup> . . . .      | 361 | July 24, 1897,     | 11,843                 | 2.24   | -                | -      | -     | -      |
| Ashland, <sup>6</sup> . . . .      | 362 | July 24, 1897,     | 9,112                  | 1.73   | -                | -      | -     | -      |
| Ayer, . . . .                      | 225 | Jan. 1, 1896,      | 15,546                 | 2.95   | -                | -      | -     | -      |
| Bedford, . . . .                   | 175 | May 14, 1895,      | 19,636                 | 3.72   | 2,872            | .54    | -     | -      |
| Belmont, . . . .                   | 343 | May 21, 1897,      | 5,109                  | .97    | -                | -      | -     | -      |
| Billerica, . . . .                 | 264 | June 13, 1896,     | 18,490                 | 3.50   | -                | -      | -     | -      |
| Boxborough, <sup>7,8</sup> . . . . | 233 | - -                | 17,508                 | 3.32   | 3,591            | .68    | -     | -      |
| Burlington, . . . .                | 336 | Apr. 16, 1897,     | 14,207                 | 2.69   | -                | -      | -     | -      |
| Carlisle, . . . .                  | 109 | Dec. 26, 1894,     | 21,531                 | 4.08   | -                | -      | -     | -      |
| Chelmsford, <sup>7,8</sup> . . . . | 50  | July 20, 1894,     | 5,583                  | 1.06   | -                | -      | 4,347 | .82    |
| Chelmsford, <sup>3,8</sup> . . . . | 266 | - -                | 6,030                  | 1.15   | -                | -      | -     | -      |
| Concord, <sup>9</sup> . . . .      | 81  | Sept. 11, 1894,    | 8,550                  | 1.62   | 3,394            | .64    | 4,325 | .82    |
| Concord, <sup>4</sup> . . . .      | 338 | Dec. 7, 1897,      | 7,068                  | 1.34   | -                | -      | -     | -      |
| Dracut, . . . .                    | 344 | June 3, 1897,      | 21,378                 | 4.15   | -                | -      | -     | -      |
| Dunstable, . . . .                 | 291 | Sept. 17, 1896,    | 8,773                  | 1.66   | -                | -      | -     | -      |
| Framingham, . . . .                | 303 | Dec. 17, 1896,     | 8,296                  | 1.57   | -                | -      | -     | -      |
| Groton, <sup>10</sup> . . . .      | 105 | Dec. 17, 1894,     | 40,215                 | 7.61   | -                | -      | -     | -      |
| Groton, <sup>4</sup> . . . .       | 219 | Nov. 14, 1895,     | 22,597                 | 4.28   | -                | -      | -     | -      |
| Holliston, . . . .                 | 363 | July 30, 1897,     | 33,480                 | 6.34   | -                | -      | -     | -      |
| Hopkinton, . . . .                 | 309 | Jan. 6, 1897,      | 20,440                 | 3.87   | -                | -      | -     | -      |
| Hudson, . . . .                    | 370 | Sept. 25, 1897,    | 31,057                 | 5.89   | -                | -      | -     | -      |
| Lexington, <sup>9</sup> . . . .    | 79  | Aug. 8, 1894,      | 18,300                 | 3.46   | 11,158           | 2.11   | 7,056 | 1.34   |
| Lexington, <sup>11</sup> . . . .   | 419 | May 14, 1898,      | 13,200                 | 2.50   | -                | -      | -     | -      |
| Lincoln, <sup>9</sup> . . . .      | 80  | Aug. 8, 1894,      | 10,850                 | 2.05   | 10,885           | 2.07   | -     | -      |
| Lincoln, <sup>12</sup> . . . .     | 377 | Oct. 30, 1897,     | 17,900                 | 3.37   | -                | -      | -     | -      |
| Littleton, <sup>13</sup> . . . .   | 213 | Nov. 14, 1895,     | 12,110                 | 2.29   | -                | -      | -     | -      |
| Littleton, <sup>3,14</sup> . . . . | 412 | - -                | 10,200                 | 1.93   | -                | -      | -     | -      |

<sup>1</sup> Littleton road *via* North Acton.<sup>2</sup> Harvard Turnpike.<sup>3</sup> On county petition.<sup>4</sup> Great road.<sup>5</sup> Southborough road.<sup>6</sup> Pond Street.<sup>7</sup> Duplicate of county petition.<sup>8</sup> Truant School road.<sup>9</sup> Concord-Lexington road.<sup>10</sup> Lowell-Fitchburg road.<sup>11</sup> Lowell road *via* Chelmsford.<sup>12</sup> South Great road.<sup>13</sup> From Littleton Depot to Great road. <sup>14</sup> Ayer road.



*Middlesex County* — Continued.

| COUNTY, CITY OR TOWN.                | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|--------------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                      |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                      |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Littleton, <sup>1,2</sup> . . .      | 413 | - -                | 27,800                 | 5.26   | -                | -      | -     | -      |
| Lowell, <sup>2,3</sup> . . .         | 44  | - -                | 5,248                  | 1.00   | 5,115            | .97    | -     | -      |
| Lowell, <sup>4,5</sup> . . .         | 55  | July 25, 1894,     | 7,011                  | 1.33   | 4,322            | .82    | 2,723 | .52    |
| Lowell, <sup>6</sup> . . .           | 409 | Mar. 9, 1898,      | 5,800                  | 1.10   | -                | -      | -     | -      |
| Marlborough, <sup>7</sup> . .        | 143 | Mar. 15, 1895,     | 12,688                 | 2.40   | 3,870            | .73    | -     | -      |
| Marlborough, <sup>8</sup> . .        | 271 | June 26, 1896,     | 17,135                 | 3.25   | 2,142            | .41    | -     | -      |
| Maynard, . . .                       | 366 | Sept. 9, 1897,     | 11,164                 | 2.11   | -                | -      | -     | -      |
| Medford, <sup>4,9</sup> . . .        | 265 | June 13, 1896,     | 4,918                  | .93    | -                | -      | -     | -      |
| Medford, <sup>9</sup> . . .          | 446 | Dec. 19, 1898,     | 4,200                  | .80    | -                | -      | -     | -      |
| Middlesex County, <sup>10</sup> .    | 44  | July 17, 1894,     | 20,800                 | 3.94   | 20,703           | 3.92   | -     | -      |
| Middlesex County, <sup>11</sup> .    | 45  | July 17, 1894,     | 12,594                 | 2.39   | 4,322            | .82    | 2,723 | .52    |
| Middlesex County, <sup>12,13</sup> . | 233 | Feb. 25, 1896,     | 39,430                 | 7.47   | 3,591            | .68    | -     | -      |
| Middlesex County, <sup>5,14</sup> .  | 266 | June 15, 1896,     | 6,030                  | 1.15   | -                | -      | 4,347 | .82    |
| Middlesex County, <sup>9,15</sup> .  | 274 | July 13, 1896,     | 11,368                 | 2.15   | 2,330            | .44    | 676   | .13    |
| Middlesex County, <sup>16</sup> .    | 412 | Feb. 3, 1898,      | 10,200                 | 1.93   | -                | -      | -     | -      |
| Middlesex County, <sup>1,17</sup> .  | 413 | Feb. 3, 1898,      | 86,865                 | 16.45  | -                | -      | -     | -      |
| Middlesex County, <sup>18</sup> .    | 427 | June 25, 1898,     | 10,088                 | 1.91   | -                | -      | -     | -      |
| Natick, . . .                        | 251 | May 21, 1896,      | 6,813                  | 1.29   | -                | -      | -     | -      |
| Newton, . . .                        | 337 | Apr. 26, 1897,     | 650                    | .12    | -                | -      | -     | -      |
| North Reading, . .                   | 107 | Dec. 24, 1894,     | 31,060                 | 5.88   | 2,640            | .50    | 2,689 | .51    |
| Pepperell, . . .                     | 299 | Nov. 11, 1896,     | 18,700                 | 3.54   | -                | -      | -     | -      |
| Reading, . . .                       | 157 | Apr. 10, 1895,     | 23,100                 | 4.38   | -                | -      | -     | -      |
| Sherborn, . . .                      | 250 | May 14, 1896,      | 5,500                  | 1.04   | -                | -      | -     | -      |
| Shirley, . . .                       | 416 | Apr. 21, 1898,     | 7,400                  | 1.40   | -                | -      | -     | -      |
| Stoneham, <sup>4,9</sup> . . .       | 280 | July 30, 1896,     | 6,450                  | 1.22   | 2,330            | .44    | 676   | .13    |
| Stoneham, <sup>9</sup> . . .         | 355 | July 7, 1897,      | 3,086                  | .58    | -                | -      | -     | -      |
| Stow, . . .                          | 378 | Nov. 1, 1897,      | 24,215                 | 4.59   | -                | -      | -     | -      |
| Sudbury, <sup>19</sup> . . .         | 214 | Aug. 24, 1895,     | 5,300                  | 1.00   | 2,193            | .41    | 2,905 | .55    |
| Sudbury, <sup>19</sup> . . .         | 230 | Feb. 16, 1896,     | 20,409                 | 3.87   | -                | -      | -     | -      |
| Tewksbury, <sup>20</sup> . . .       | 257 | June 5, 1896,      | 14,770                 | 2.80   | -                | -      | -     | -      |

<sup>1</sup> Great road.<sup>2</sup> On county petition.<sup>3</sup> Tyngsborough road; boulevard.<sup>4</sup> Duplicate of county petition.<sup>5</sup> Truant School road.<sup>6</sup> Dracut road.<sup>7</sup> Northborough road.<sup>8</sup> Sudbury road.<sup>9</sup> Stoneham road.<sup>10</sup> See Lowell and Tyngsborough.<sup>11</sup> See Lowell and Chelmsford, Truant School road.<sup>12</sup> Harvard Turnpike.<sup>13</sup> See Acton and Boxborough.<sup>14</sup> See Chelmsford.<sup>15</sup> See Medford and Stoneham.<sup>16</sup> See Littleton.<sup>17</sup> See Littleton, Acton, Concord and Groton.<sup>18</sup> See Tewksbury; Lowell-Lawrence road.<sup>19</sup> Boston-Worcester road.<sup>20</sup> Boston-Lowell road.



*Middlesex County — Concluded.*

| COUNTY, CITY OR TOWN.              | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |        |        |
|------------------------------------|-----|--------------------|------------------------|--------|------------------|--------|--------|--------|
|                                    |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898.  |        |
|                                    |     |                    |                        |        | Feet.            | Miles. | Feet.  | Miles. |
| Tewksbury, <sup>1</sup> . . .      | 357 | July 8, 1897,      | 20,188                 | 3.82   | -                | -      | -      | -      |
| Tewksbury, <sup>2,3</sup> . . .    | 427 | - -                | 11,088                 | 1.91   | -                | -      | -      | -      |
| Townsend, . . .                    | 149 | Mar. 21, 1895,     | 16,830                 | 3.19   | 5,952            | 1.12   | 3,492  | .66    |
| Tyngsborough, <sup>3,4</sup> . . . | 44  | - -                | 15,552                 | 2.94   | 15,588           | 2.95   | -      | -      |
| Tyngsborough, <sup>5</sup> . . .   | 444 | Dec. 18, 1898,     | 21,120                 | 4.00   | -                | -      | -      | -      |
| Wakefield, . . .                   | 400 | Dec. 29, 1897,     | 17,979                 | 3.41   | -                | -      | -      | -      |
| Watertown, . . .                   | 151 | Mar. 27, 1895,     | 17,736                 | 3.36   | 4,472            | .85    | -      | -      |
| Wayland, <sup>6</sup> . . .        | 212 | Aug. 10, 1895,     | 15,450                 | 2.93   | 3,206            | .61    | -      | -      |
| Wayland, <sup>7</sup> . . .        | 334 | Mar. 31, 1897,     | 11,620                 | 2.20   | -                | -      | -      | -      |
| Westford, . . .                    | 115 | Jan. 10, 1895,     | 21,900                 | 4.15   | -                | -      | -      | -      |
| Weston, <sup>6</sup> . . .         | 322 | Feb. 24, 1897,     | 17,509                 | 3.32   | -                | -      | 6,670  | 1.26   |
| Weston, <sup>7</sup> . . .         | 323 | Feb. 24, 1897,     | 21,269                 | 4.03   | -                | -      | -      | -      |
| Wilmington, <sup>8</sup> . . .     | 345 | June 10, 1897,     | 37,682                 | 7.14   | -                | -      | -      | -      |
| Wilmington, <sup>1</sup> . . .     | 349 | July 22, 1897,     | 9,918                  | 1.88   | -                | -      | -      | -      |
| Winchester, . . .                  | 244 | Apr. 28, 1896,     | 10,300                 | 1.95   | -                | -      | -      | -      |
| Woburn, <sup>9</sup> . . .         | 448 | Dec. 21, 1898,     | 9,925                  | 1.88   | -                | -      | -      | -      |
| Woburn, <sup>10</sup> . . .        | 449 | Dec. 21, 1898,     | 19,800                 | 3.75   | -                | -      | -      | -      |
| Totals, . . .                      | .   | .                  | 1,079,431              | 204.44 | 96,666           | 18.31  | 38,485 | 7.29   |

Seventy petitions (eight county, nine city and fifty-three town), in five cities and forty-two towns.

Average distance petitioned for, 15,420 feet (2.92 miles).

Thirty-seven lay-outs, in two cities and fourteen towns.

Laid out on county petitions, 86,362 feet (6.89 miles).

Laid out on city petitions, 6,012 feet (1.14 miles).

Laid out on town petitions, 92,777 feet (17.57 miles).

Total length laid out, 135,151 feet (25.60 miles); average, 3,653 feet (.69 mile).

Percentage of length laid out to distance petitioned for, 12.52.

<sup>1</sup> Boston-Lowell road.

<sup>2</sup> Lowell-Lawrence road.

<sup>3</sup> On county petition.

<sup>4</sup> Lowell road; boulevard.

<sup>5</sup> West river road.

<sup>6</sup> Boston-Worcester road.

<sup>7</sup> Boston-Framingham road.

<sup>8</sup> Boston-Lawrence road.

<sup>9</sup> Cambridge Street.

<sup>10</sup> Main, School, Plain, Washington and Salem streets and Mishawum road.

*Nantucket County.*

| COUNTY, CITY OR TOWN. | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|-----------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                       |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                       |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Nantucket, . . .      | 11  | July 3, 1894,      | 34,185                 | 6.47   | 22,270           | 4.23   | -     | -      |

Six lay-outs.

Length laid out, 22,270 feet (4.23 miles).

Percentage of length laid out to length petitioned for, 65.08.

*Norfolk County.*

| COUNTY. CITY OR<br>TOWN.       | No. | Petition<br>Received. | LENGTH<br>PETITIONED<br>FOR. |        | LENGTH LAID OUT. |        |       |        |
|--------------------------------|-----|-----------------------|------------------------------|--------|------------------|--------|-------|--------|
|                                |     |                       | Feet.                        | Miles. | 1894-97.         |        | 1898. |        |
|                                |     |                       |                              |        | Feet.            | Miles. | Feet. | Miles. |
| Bellingham, . . .              | 173 | May 13, 1895,         | 3,900                        | .74    | -                | -      | -     | -      |
| Bellingham, . . .              | 424 | June 22, 1898,        | 46,730                       | 8.85   | -                | -      | -     | -      |
| Braintree, . . .               | 116 | Jan. 10, 1895,        | 6,700                        | 1.27   | -                | -      | -     | -      |
| Cohasset, . . .                | 158 | Apr. 2, 1895,         | 11,300                       | 2.14   | 2,200            | .41    | -     | -      |
| Dedham, . . .                  | 307 | Dec. 31, 1896,        | 3,900                        | .75    | -                | -      | -     | -      |
| Foxborough, <sup>1</sup> . . . | 123 | Jan. 29, 1895,        | 29,640                       | 5.50   | -                | -      | -     | -      |
| Foxborough, <sup>2</sup> . . . | 163 | Apr. 24, 1895,        | 5,840                        | 1.11   | -                | -      | -     | -      |
| Franklin, . . .                | 298 | Nov. 6, 1896,         | 9,227                        | 1.75   | -                | -      | -     | -      |
| Holbrook, . . .                | 9   | July 10, 1894,        | 11,848                       | 2.24   | 5,817            | 1.11   | -     | -      |
| Medway, <sup>3</sup> . . .     | 311 | Jan. 18, 1897,        | 5,535                        | 1.05   | -                | -      | -     | -      |
| Medway, <sup>4</sup> . . .     | 368 | Sept. 2, 1897,        | 15,587                       | 2.95   | -                | -      | -     | -      |
| Mills, . . .                   | 381 | Nov. 12, 1897,        | 6,265                        | 1.19   | -                | -      | -     | -      |
| Milton, . . .                  | 190 | June 15, 1895,        | 5,730                        | 1.09   | -                | -      | -     | -      |
| Needham, . . .                 | 154 | Apr. 2, 1895,         | 9,050                        | 1.71   | -                | -      | -     | -      |
| Norfolk, <sup>5</sup> . . .    | 88  | Sept. 21, 1894,       | 7,673                        | 1.45   | 7,676            | 1.45   | -     | -      |
| Norfolk, <sup>6</sup> . . .    | 356 | July 8, 1897,         | 21,467                       | 4.07   | -                | -      | -     | -      |
| Norwood, . . .                 | 51  | July 21, 1894,        | 18,747                       | 3.55   | 8,197            | 1.55   | -     | -      |
| Quincy, <sup>7</sup> . . .     | 237 | Mar. 18, 1896,        | 9,920                        | 1.88   | -                | -      | -     | -      |
| Quincy, <sup>8</sup> . . .     | 292 | Sept. 17, 1896,       | 7,400                        | 1.40   | -                | -      | -     | -      |
| Randolph, . . .                | 208 | Aug. 3, 1895,         | 9,050                        | 1.71   | -                | -      | -     | -      |
| Sharon, . . .                  | 159 | Apr. 12, 1895,        | 28,713                       | 5.44   | -                | -      | -     | -      |
| Stoughton, . . .               | 228 | Jan. 15, 1896,        | 20,538                       | 3.89   | -                | -      | -     | -      |
| Walpole, . . .                 | 77  | Aug. 4, 1894,         | 30,300                       | 5.74   | 14,529           | 2.75   | 4,840 | .92    |
| Wellesley, . . .               | 425 | June 22, 1898,        | 21,120                       | 4.00   | -                | -      | -     | -      |
| Westwood, . . .                | 354 | July 2, 1897,         | 5,659                        | 1.07   | -                | -      | -     | -      |
| Weymouth, <sup>9</sup> . . .   | 59  | July 27, 1894,        | 9,400                        | 1.78   | 9,237            | 1.75   | -     | -      |
| Weymouth, <sup>10</sup> . . .  | 63  | July 30, 1894,        | 1,330                        | .25    | 1,330            | .25    | -     | -      |
| Weymouth, <sup>11</sup> . . .  | 414 | Mar. 28, 1898,        | 27,942                       | 5.29   | -                | -      | -     | -      |
| Wrentham, . . .                | 32  | July 10, 1894,        | 38,150                       | 7.23   | 11,340           | 2.15   | 4,700 | .89    |
| Totals, . . .                  | .   | .                     | 428,064                      | 81.07  | 60,326           | 11.42  | 9,540 | 1.81   |

Twenty-nine petitions (two city and twenty-seven town), in one city and twenty-one towns.

Average length petitioned for, 14,759 feet (2.80 miles).

Twenty-one lay-outs, in seven towns; all lay-outs on town petitions.

Total length laid out, 69,866 feet (13.23 miles); average, 3,327 feet (.63 mile).

Percentage of length laid out to distance petitioned for, 16.32.

<sup>1</sup> Mansfield-Norfolk road.

<sup>2</sup> Village road.

<sup>3</sup> Village Street.

<sup>4</sup> Village, Main and Oakland streets. <sup>5</sup> Providence Turnpike. <sup>6</sup> Walpole-Franklin road.

<sup>7</sup> Washington Street; Weymouth road.

<sup>8</sup> Randolph Street.

<sup>9</sup> Bridge Street; Hingham road

<sup>10</sup> Ann Street.

<sup>11</sup> Washington and Main streets.

*Plymouth County.*

| COUNTY, CITY OR TOWN.            | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |        |        |
|----------------------------------|-----|--------------------|------------------------|--------|------------------|--------|--------|--------|
|                                  |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898.  |        |
|                                  |     |                    |                        |        | Feet.            | Miles. | Feet.  | Miles. |
| Abington, <sup>1</sup> . . .     | 58  | July 27, 1894,     | 8,700                  | 1.66   | -                | -      | -      | -      |
| Abington, <sup>2</sup> . . .     | 192 | Apr. 19, 1895,     | 10,300                 | 1.95   | -                | -      | -      | -      |
| Bridgewater, . . .               | 217 | Nov. 14, 1895,     | 6,600                  | 1.25   | -                | -      | -      | -      |
| Brockton, <sup>3</sup> . . .     | 61  | July 27, 1894,     | 5,525                  | 1.05   | -                | -      | -      | -      |
| Brockton, <sup>4</sup> . . .     | 270 | June 22, 1896,     | 10,320                 | 1.96   | 4,186            | .79    | 2,071  | .39    |
| Carver, <sup>5</sup> . . .       | 326 | Mar. 4, 1897,      | 5,280                  | 1.00   | -                | -      | -      | -      |
| Carver, <sup>6</sup> . . .       | 438 | Dec. 9, 1898,      | 23,400                 | 5.38   | -                | -      | -      | -      |
| Duxbury, . . .                   | 70  | July 31, 1894,     | 33,000                 | 6.25   | 7,187            | 1.36   | -      | -      |
| East Bridgewater, . .            | 240 | Apr. 8, 1896,      | 6,300                  | 1.19   | -                | -      | -      | -      |
| Halifax, . . .                   | 54  | July 24, 1894,     | 23,463                 | 4.44   | -                | -      | -      | -      |
| Hanover, . . .                   | 66  | July 30, 1894,     | 24,157                 | 4.58   | -                | -      | -      | -      |
| Hanson, <sup>7</sup> . . .       | 262 | June 12, 1896,     | 5,280                  | 1.00   | -                | -      | -      | -      |
| Hanson, <sup>8</sup> . . .       | 263 | June 12, 1896,     | 5,280                  | 1.00   | -                | -      | -      | -      |
| Hingham, . . .                   | 8   | July 3, 1894,      | 27,655                 | 5.24   | 14,037           | 2.66   | -      | -      |
| Lakeville, . . .                 | 174 | May 14, 1895,      | 5,300                  | 1.00   | -                | -      | -      | -      |
| Marion, . . .                    | 29  | July 10, 1894,     | 27,248                 | 5.16   | 10,780           | 2.04   | -      | -      |
| Marshfield, . . .                | 71  | July 31, 1894,     | 40,400                 | 7.65   | 5,222            | .99    | 2,449  | .46    |
| Mattapoisett, . . .              | 30  | July 10, 1894,     | 24,992                 | 4.73   | 6,134            | 1.17   | -      | -      |
| Middleborough, <sup>9</sup> . .  | 68  | July 31, 1894,     | 77,169                 | 14.62  | 12,306           | 2.33   | 2,270  | .43    |
| Middleborough, <sup>10</sup> . . | 428 | June 30, 1898,     | 32,310                 | 6.12   | -                | -      | -      | -      |
| Norwell, . . .                   | 246 | May 5, 1896,       | 5,923                  | 1.12   | -                | -      | -      | -      |
| Pembroke, . . .                  | 234 | Feb. 27, 1896,     | 5,280                  | 1.00   | -                | -      | -      | -      |
| Plymouth, <sup>11</sup> . . .    | 72  | July 31, 1894,     | 90,420                 | 17.13  | 7,509            | 1.42   | -      | -      |
| Plymouth, <sup>12</sup> . . .    | 269 | June 22, 1896,     | 5,846                  | 1.11   | 5,846            | 1.11   | -      | -      |
| Plymouth, <sup>12</sup> . . .    | 374 | Oct. 11, 1897,     | 9,130                  | 1.73   | 5,417            | 1.02   | 1,570  | .30    |
| Plympton, . . .                  | 121 | Jan. 22, 1895,     | 5,380                  | 1.02   | -                | -      | -      | -      |
| Rochester, . . .                 | 172 | May 13, 1895,      | 22,108                 | 4.19   | -                | -      | -      | -      |
| Rockland, . . .                  | 75  | Aug. 1, 1894,      | 6,900                  | 1.30   | -                | -      | -      | -      |
| Scituate, . . .                  | 69  | July 31, 1894,     | 28,500                 | 5.39   | 6,139            | 1.17   | -      | -      |
| Wareham, <sup>13</sup> . . .     | 42  | July 16, 1894,     | 60,100                 | 11.38  | 3,014            | .57    | -      | -      |
| Wareham, <sup>14</sup> . . .     | 406 | Feb. 5, 1898,      | 18,200                 | 3.45   | -                | -      | 5,529  | 1.05   |
| West Bridgewater, . .            | 221 | Dec. 4, 1895,      | 17,100                 | 3.24   | -                | -      | -      | -      |
| Whitman, . . .                   | 65  | July 30, 1894,     | 8,900                  | 1.68   | 8,957            | 1.69   | -      | -      |
| Totals, . . .                    |     |                    | 378,875                | 71.76  | 96,734           | 18.32  | 13,889 | 2.63   |

Thirty-three petitions (two city and thirty-one town), in one city and twenty-four towns.

Average distance petitioned for, 11,481 feet (2.17 miles).

Thirty-eight lay-outs, in one city and ten towns.

Laid out on city petitions, 6,257 feet (1.18 miles).

Laid out on town petitions, 104,366 feet (19.77 miles).

Total length laid out, 110,623 feet (20.95 miles); average, 2,911 feet (.55 mile).

Percentage of length laid out to distance petitioned for, 29.19.

<sup>1</sup> Randolph Street.

<sup>2</sup> Brockton Avenue.

<sup>3</sup> Crescent Street.

<sup>4</sup> Belmont Street.

<sup>5</sup> Plymouth-Wareham road.

<sup>6</sup> Embraces former petition.

<sup>7</sup> Main Street.

<sup>8</sup> Whitman Street.

<sup>9</sup> Brockton-Wareham road.

<sup>10</sup> New plan in part of earlier petition.

<sup>11</sup> South Shore road.

<sup>12</sup> Pine Hills road.

<sup>13</sup> Fall River-Cape Cod road.

<sup>14</sup> Onset road.

*Suffolk County.*

| COUNTY, CITY OR TOWN.          | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|--------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Chelsea, . . . .               | 56  | July 25, 1894,     | 6,000                  | 1.14   | -                | -      | -     | -      |
| Revere, <sup>1</sup> . . . .   | 60  | July 27, 1894,     | 11,475                 | 2.17   | -                | -      | -     | -      |
| Revere, <sup>2</sup> . . . .   | 346 | June 10, 1897,     | 6,506                  | 1.23   | -                | -      | -     | -      |
| Revere, <sup>3</sup> . . . .   | 350 | June 24, 1897,     | 3,469                  | .66    | 3,045            | .58    | -     | -      |
| Revere, <sup>4</sup> . . . .   | 407 | Feb. 7, 1898,      | 11,000                 | 2.09   | -                | -      | -     | -      |
| Winthrop, <sup>5</sup> . . . . | 73  | July 31, 1894,     | 18,100                 | 3.42   | -                | -      | -     | -      |
| Winthrop, <sup>6</sup> . . . . | 451 | Dec. 29, 1898,     | 2,640                  | .50    | -                | -      | -     | -      |
| Totals, . . . .                | .   | .                  | 57,550                 | 10.90  | 3,045            | .58    | -     | -      |

Seven petitions (one city, six town), in one city and two towns.

Average distance petitioned for, 8,221 feet (1.56 miles).

Three lay-outs, in one town.

Percentage of length laid out to distance petitioned for, 5.32.

<sup>1</sup> Salem Turnpike.

<sup>2</sup> Ocean Avenue.

<sup>3</sup> Atlantic Avenue.

<sup>4</sup> Ocean Avenue extension.

<sup>5</sup> Revere Street and Crest Avenue.

<sup>6</sup> Duplication of part of former petition.

*Worcester County.*

| COUNTY, CITY OR TOWN.            | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|----------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                  |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                  |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Athol, . . . .                   | 37  | July 12, 1894,     | 16,800                 | 3.18   | 8,475            | 1.61   | -     | -      |
| Auburn, . . . .                  | 148 | Mar. 30, 1895,     | 27,720                 | 5.25   | 10,172           | 1.93   | 2,383 | .45    |
| Auburn, <sup>1</sup> . . . .     | 433 | Aug. 24, 1895,     | 1,437                  | .27    | -                | -      | -     | -      |
| Barre, . . . .                   | 146 | Mar. 10, 1895,     | 15,286                 | 2.89   | 3,545            | .67    | -     | -      |
| Blackstone, <sup>2</sup> . . . . | 140 | Mar. 2, 1895,      | 7,700                  | 1.46   | -                | -      | -     | -      |
| Blackstone, <sup>3</sup> . . . . | 399 | Dec. 29, 1897,     | 12,296                 | 2.33   | -                | -      | -     | -      |
| Bolton, . . . .                  | 185 | June 3, 1895,      | 5,280                  | 1.00   | -                | -      | -     | -      |
| Boylston, . . . .                | 398 | Dec. 23, 1897,     | 10,560                 | 2.00   | -                | -      | -     | -      |
| Brookfield, <sup>4</sup> . . . . | 111 | Jan. 2, 1895,      | 5,972                  | 1.13   | -                | -      | -     | -      |
| Brookfield, <sup>4</sup> . . . . | 300 | Nov. 27, 1896,     | 22,025                 | 4.17   | 2,956            | .56    | 1,714 | .32    |
| Charlton, <sup>5</sup> . . . .   | 261 | June 11, 1896,     | 10,700                 | 2.03   | -                | -      | -     | -      |
| Charlton, <sup>6</sup> . . . .   | 389 | Dec. 13, 1897,     | 5,280                  | 1.00   | -                | -      | -     | -      |
| Dana, . . . .                    | 294 | Sept. 24, 1896,    | 10,560                 | 2.00   | -                | -      | -     | -      |
| Douglas, . . . .                 | 384 | Dec. 1, 1897,      | 10,567                 | 2.00   | -                | -      | -     | -      |

<sup>1</sup> Proposed relocation.

<sup>2</sup> Main Street, from Woonsocket line.

<sup>3</sup> Main Street, from Uxbridge line.

<sup>4</sup> Springfield-Worcester road.

<sup>5</sup> From Charlton depot.

<sup>6</sup> From Oxford line.



## Worcester County — Continued.

| COUNTY, CITY OR TOWN.              | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|------------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                    |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                    |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Dudley, . . . .                    | 391 | Dec. 16, 1897,     | 15,840                 | 3.00   | -                | -      | -     | -      |
| Fitchburg, <sup>1</sup> . . . .    | 17  | July 5, 1894,      | 5,493                  | 1.04   | 5,133            | .97    | -     | -      |
| Fitchburg, <sup>2</sup> . . . .    | 62  | July 20, 1894,     | 20,800                 | 3.94   | -                | -      | -     | -      |
| Fitchburg, <sup>3</sup> . . . .    | 93  | Oct. 3, 1894,      | 10,560                 | 2.00   | -                | -      | -     | -      |
| Fitchburg, <sup>4</sup> . . . .    | 339 | May 14, 1897,      | 5,280                  | 1.00   | 3,196            | .61    | -     | -      |
| Gardner, . . . .                   | 13  | July 3, 1894,      | 29,656                 | 5.62   | 3,152            | .60    | 9,368 | 1.77   |
| Grafton, . . . .                   | 213 | Aug. 15, 1895,     | 16,971                 | 3.21   | 4,150            | .79    | -     | -      |
| Hardwick, . . . .                  | 207 | July 31, 1895,     | 5,357                  | 1.01   | 2,052            | .39    | -     | -      |
| Harvard, . . . .                   | 260 | June 11, 1896,     | 25,775                 | 4.88   | -                | -      | -     | -      |
| Holden, <sup>5</sup> . . . .       | 10  | July 3, 1894,      | 27,920                 | 5.29   | 14,281           | 2.70   | 2,409 | .46    |
| Holden, <sup>6</sup> . . . .       | 437 | Nov. 2, 1898,      | 9,240                  | 1.75   | -                | -      | -     | -      |
| Hopedale, <sup>7</sup> . . . .     | 144 | Mar. 16, 1895,     | 6,040                  | 1.14   | -                | -      | -     | -      |
| Hopedale, <sup>8</sup> . . . .     | 423 | June 20, 1898,     | 1,760                  | .33    | -                | -      | -     | -      |
| Hubbardston, . . . .               | 232 | Feb. 24, 1896,     | 10,560                 | 2.00   | -                | -      | -     | -      |
| Lancaster, . . . .                 | 137 | Feb. 28, 1895,     | 24,808                 | 4.70   | -                | -      | -     | -      |
| Leicester, . . . .                 | 25  | July 9, 1894,      | 23,110                 | 5.32   | 13,918           | 2.64   | 3,169 | 1.55   |
| Leominster, . . . .                | 91  | Sept. 29, 1894,    | 26,400                 | 5.00   | -                | -      | -     | -      |
| Lunenburg, . . . .                 | 16  | July 5, 1894,      | 30,772                 | 5.83   | -                | -      | 2,275 | .43    |
| Mendon, . . . .                    | 84  | Aug. 20, 1894,     | 18,432                 | 3.49   | -                | -      | -     | -      |
| Millbury, . . . .                  | 372 | Oct. 2, 1897,      | 19,400                 | 3.68   | -                | -      | -     | -      |
| Milford, <sup>9</sup> . . . .      | 420 | June 6, 1898,      | 9,290                  | 1.76   | -                | -      | -     | -      |
| Milford, <sup>10</sup> . . . .     | 421 | June 6, 1898,      | 5,500                  | 1.04   | -                | -      | -     | -      |
| New Braintree, . . . .             | 210 | Aug. 6, 1895,      | 939                    | .18    | 920              | .17    | -     | -      |
| Northborough, <sup>1</sup> . . . . | 122 | Jan. 24, 1895,     | 3,834                  | .73    | -                | -      | -     | -      |
| Northborough, <sup>2</sup> . . . . | 153 | Apr. 1, 1895,      | 11,000                 | 2.08   | 3,325            | .63    | 3,874 | .73    |
| Northborough, <sup>3</sup> . . . . | 373 | Oct. 4, 1897,      | 2,200                  | .42    | 2,231            | .42    | -     | -      |
| North Brookfield, . . . .          | 324 | Feb. 25, 1897,     | 11,915                 | 2.26   | -                | -      | -     | -      |
| Oakham, . . . .                    | 199 | July 11, 1895,     | 15,045                 | 2.85   | -                | -      | -     | -      |
| Oxford, <sup>4</sup> . . . .       | 108 | Dec. 24, 1894,     | 33,550                 | 6.35   | -                | -      | -     | -      |
| Oxford, <sup>5</sup> . . . .       | 404 | Jan. 25, 1898,     | 10,560                 | 2.00   | -                | -      | -     | -      |
| Paxton, . . . .                    | 33  | July 10, 1894,     | 23,500                 | 5.40   | 13,932           | 2.64   | 3,184 | .60    |
| Petersham, . . . .                 | 296 | Oct. 22, 1896,     | 23,744                 | 4.49   | -                | -      | -     | -      |
| Phillipston, . . . .               | 14  | July 3, 1894,      | 17,400                 | 3.30   | 2,642            | .50    | 3,659 | .69    |

<sup>1</sup> Westminster road.    <sup>2</sup> Ashby road.    <sup>3</sup> Leominster road.<sup>4</sup> Lunenburg road.<sup>5</sup> Worcester-Gardner road.<sup>6</sup> Milford-Mendon road.<sup>7</sup> Milford-Upton road.<sup>8</sup> Westborough Hospital road.<sup>9</sup> Marlborough-Worcester road.<sup>10</sup> Webster road.

## Worcester County—Continued.

| COUNTY, CITY OR TOWN.               | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |       |        |
|-------------------------------------|-----|--------------------|------------------------|--------|------------------|--------|-------|--------|
|                                     |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898. |        |
|                                     |     |                    |                        |        | Feet.            | Miles. | Feet. | Miles. |
| Princeton, <sup>1</sup> . . . .     | 193 | June 22, 1895,     | 14,221                 | 2.69   | 2,602            | .49    | -     | -      |
| Princeton, <sup>2</sup> . . . .     | 452 | Dec. 29, 1893,     | 5,708                  | 1.08   | -                | -      | -     | -      |
| Royalston, . . . .                  | 302 | Dec. 7, 1896,      | 23,195                 | 4.39   | -                | -      | -     | -      |
| Rutland, <sup>3</sup> . . . .       | 141 | Mar. 5, 1895,      | 24,581                 | 4.65   | -                | -      | -     | -      |
| Rutland, <sup>4</sup> . . . .       | 142 | Mar. 5, 1895,      | 24,268                 | 4.59   | -                | -      | -     | -      |
| Shrewsbury, <sup>5</sup> . . . .    | 21  | July 6, 1894,      | 11,000                 | 2.08   | 11,000           | 2.08   | -     | -      |
| Shrewsbury, <sup>6</sup> . . . .    | 308 | Jan. 6, 1897,      | 4,092                  | .78    | 1,717            | .33    | 2,375 | .45    |
| Shrewsbury, <sup>7</sup> . . . .    | 394 | Dec. 22, 1897,     | 2,800                  | .53    | -                | -      | 825   | .16    |
| Shrewsbury, <sup>8</sup> . . . .    | 429 | July 11, 1898,     | 10,560                 | 2.00   | -                | -      | -     | -      |
| Southborough, <sup>9</sup> . . . .  | 161 | Apr. 18, 1895,     | 5,300                  | 1.00   | -                | -      | -     | -      |
| Southborough, <sup>10</sup> . . . . | 447 | Dec. 20, 1898,     | 5,440                  | 1.03   | -                | -      | -     | -      |
| Southbridge, . . . .                | 403 | Jan. 13, 1898,     | 9,846                  | 1.86   | -                | -      | -     | -      |
| Spencer, <sup>11</sup> . . . .      | 49  | July 19, 1894,     | 23,418                 | 4.44   | 2,276            | .43    | -     | -      |
| Spencer, <sup>12</sup> . . . .      | 320 | Feb. 19, 1897,     | 5,280                  | 1.00   | -                | -      | -     | -      |
| Sterling, <sup>13</sup> . . . .     | 168 | May 1, 1895,       | 5,280                  | 1.00   | 4,034            | .76    | -     | -      |
| Sterling, <sup>14</sup> . . . .     | 318 | Feb. 18, 1897,     | 5,280                  | 1.00   | -                | -      | -     | -      |
| Sterling, <sup>15</sup> . . . .     | 319 | Feb. 18, 1897,     | 12,882                 | 2.44   | -                | -      | -     | -      |
| Sterling, <sup>16</sup> . . . .     | 358 | July 8, 1897,      | 500                    | .09    | -                | -      | -     | -      |
| Sterling, <sup>17</sup> . . . .     | 396 | Dec. 23, 1897,     | 10,091                 | 1.91   | -                | -      | 2,807 | .53    |
| Sturbridge, . . . .                 | 169 | May 7, 1895,       | 12,600                 | 2.39   | 3,094            | .59    | -     | -      |
| Sutton, <sup>18</sup> . . . .       | 85  | Aug. 25, 1894,     | 6,096                  | 1.16   | -                | -      | -     | -      |
| Sutton, <sup>19</sup> . . . .       | 385 | Dec. 1, 1897,      | 4,778                  | .90    | -                | -      | -     | -      |
| Templeton, . . . .                  | 86  | Sept. 1, 1894,     | 31,668                 | 6.00   | -                | -      | -     | -      |
| Upton, . . . .                      | 305 | Dec. 18, 1896,     | 24,743                 | 4.69   | -                | -      | -     | -      |
| Uxbridge, <sup>20</sup> . . . .     | 89  | Sept. 23, 1894,    | 15,759                 | 2.99   | 3,563            | .68    | 3,154 | .60    |
| Uxbridge, <sup>21</sup> . . . .     | 379 | Nov 2, 1897,       | 6,140                  | 1.17   | -                | -      | -     | -      |
| Warren, <sup>22</sup> . . . .       | 15  | July 5, 1894,      | 28,020                 | 5.31   | 7,661            | 1.45   | 2,317 | .44    |
| Warren, <sup>23</sup> . . . .       | 39  | July 16, 1894,     | 18,868                 | 3.57   | -                | -      | -     | -      |
| Webster, . . . .                    | 392 | Dec. 16, 1897,     | 7,700                  | 1.46   | -                | -      | -     | -      |
| Westborough, <sup>24</sup> . . . .  | 160 | Apr. 14, 1895,     | 1,100                  | .21    | 1,100            | .21    | -     | -      |
| Westborough, <sup>25</sup> . . . .  | 306 | Dec. 30, 1896,     | 5,300                  | 1.00   | -                | -      | -     | -      |

<sup>1</sup> Princeton Depot road.<sup>2</sup> Sterling road.<sup>3</sup> Holden road.<sup>4</sup> Worcester-Athol road.<sup>5</sup> Marlborough-Worcester road.<sup>6</sup> To Framingham.<sup>7</sup> To Westborough.<sup>8</sup> Springfield-Worcester road.<sup>9</sup> Worcester-Fitchburg road.<sup>10</sup> Lancaster road.<sup>11</sup> Wilkinsonville-Grafton road.<sup>12</sup> Worcester road.<sup>13</sup> Blackstone road.<sup>14</sup> Mendon road.<sup>15</sup> To Connecticut line.<sup>16</sup> Westborough Hospital road.<sup>17</sup> Agricultural grounds road.

*Worcester County — Concluded.*

| COUNTY, CITY OR TOWN.             | No. | Petition Received. | LENGTH PETITIONED FOR. |        | LENGTH LAID OUT. |        |        |        |
|-----------------------------------|-----|--------------------|------------------------|--------|------------------|--------|--------|--------|
|                                   |     |                    | Feet.                  | Miles. | 1894-97.         |        | 1898.  |        |
|                                   |     |                    |                        |        | Feet.            | Miles. | Feet.  | Miles. |
| Westborough, <sup>1</sup> . .     | 371 | Sept. 27, 1897,    | 2,579                  | .49    | 2,579            | .49    | -      | -      |
| Westborough, <sup>1</sup> . .     | 401 | Jan. 10, 1898,     | 6,048                  | 1.15   | -                | -      | -      | -      |
| West Boylston, <sup>2</sup> . .   | 310 | Jan. 15, 1897,     | 6,100                  | 1.16   | 5,228            | .99    | 872    | .17    |
| West Boylston, <sup>2</sup> . .   | 369 | Sept. 22, 1897,    | 3,900                  | .74    | -                | -      | 2,100  | .40    |
| West Brookfield, <sup>3</sup> . . | 222 | Dec. 5, 1895,      | 800                    | .15    | -                | -      | -      | -      |
| West Brookfield, <sup>4</sup> . . | 312 | Jan. 25, 1897,     | 13,350                 | 2.53   | -                | -      | -      | -      |
| West Brookfield, <sup>4</sup> . . | 382 | Nov. 12, 1897,     | 5,280                  | 1.00   | -                | -      | -      | -      |
| Westminster, . . .                | 23  | July 9, 1894,      | 30,590                 | 5.79   | 11,673           | 2.22   | 2,557  | .48    |
| Winchendon, . . .                 | 317 | Feb. 17, 1897,     | 8,861                  | 1.68   | -                | -      | -      | -      |
| Worcester, <sup>5</sup> . . .     | 162 | Apr. 22, 1895,     | 7,636                  | 1.44   | 7,157            | 1.35   | -      | -      |
| Worcester, <sup>6</sup> . . .     | 327 | Mar. 4, 1897,      | 12,150                 | 2.30   | 3,486            | .66    | -      | -      |
| Worcester, <sup>7</sup> . . .     | 328 | Mar. 4, 1897,      | 20,445                 | 3.87   | -                | -      | -      | -      |
| Totals, . . .                     | .   | .                  | 1,159,087              | 219.52 | 161,250          | 30.54  | 54,042 | 10.24  |

Ninety petitions (seven city and eighty-three town), in two cities and fifty-three towns.

Average distance petitioned for, 12,878 feet (2.44 miles).

Seventy-three lay-outs, in two cities and twenty-five towns.

Laid out on city petitions, 18,972 feet (3.60 miles).

Laid out on town petitions, 196,320 feet (36.99 miles).

Total length laid out, 215,292 feet (40.59 miles); average, 2,949 feet (.56 mile).

Percentage of length laid out to distance petitioned for, 18.49.

<sup>1</sup> Westborough Hospital road.

<sup>3</sup> Ware road.

<sup>5</sup> Worcester-Athol road.

<sup>7</sup> Worcester-Gardner road.

<sup>2</sup> Worcester-Fitchburg road.

<sup>4</sup> Springfield-Worcester road.

<sup>6</sup> Holden road.

*Statement showing Number of County, City and Town Petitions, distribution of Petitions among Municipalities, and Number of Cities and Towns in which Lay-outs have been made, by Counties.*

| COUNTIES.         | PETITIONS RECEIVED. |       |       |        | PETITIONS SITUATED IN — |        |        | LAY-OUTS MADE IN — |        |        | Number of Lay-outs. |
|-------------------|---------------------|-------|-------|--------|-------------------------|--------|--------|--------------------|--------|--------|---------------------|
|                   | County.             | City. | Town. | Total. | Cities.                 | Towns. | Total. | Cities.            | Towns. | Total. |                     |
| Barnstable, . . . | -                   | -     | 21    | 21     | -                       | 13     | 13     | -                  | 7      | 7      | 27                  |
| Berkshire . . .   | 15                  | 5     | 26    | 46     | 2                       | 22     | 24     | 2                  | 8      | 10     | 27                  |
| Bristol, . . .    | 1                   | 4     | 20    | 25     | 2                       | 16     | 18     | 1                  | 7      | 8      | 21                  |
| Dukes, . . .      | 2                   | -     | 4     | 6      | -                       | 5      | 5      | -                  | 4      | 4      | 8                   |
| Essex, . . .      | 2                   | 12    | 29    | 43     | 6                       | 24     | 30     | 4                  | 7      | 11     | 22                  |
| Franklin, . . .   | 1                   | -     | 32    | 33     | -                       | 16     | 16     | -                  | 10     | 10     | 26                  |
| Hampden, . . .    | 4                   | 1     | 15    | 20     | 2                       | 15     | 17     | 1                  | 6      | 7      | 25                  |
| Hampshire, . . .  | 1                   | 2     | 25    | 28     | 1                       | 17     | 18     | 1                  | 8      | 9      | 21                  |
| Middlesex, . . .  | 8                   | 9     | 53    | 70     | 5                       | 42     | 47     | 2                  | 14     | 16     | 37                  |
| Nantucket, . . .  | -                   | -     | 1     | 1      | -                       | 1      | 1      | -                  | 1      | 1      | 6                   |
| Norfolk, . . .    | -                   | 2     | 27    | 29     | 1                       | 21     | 22     | -                  | 7      | 7      | 21                  |
| Plymouth, . . .   | -                   | 2     | 31    | 33     | 1                       | 24     | 25     | 1                  | 10     | 11     | 38                  |
| Suffolk, . . .    | -                   | 1     | 6     | 7      | 1                       | 2      | 3      | -                  | 1      | 1      | 3                   |
| Worcester, . . .  | -                   | 7     | 83    | 90     | 2                       | 53     | 55     | 2                  | 25     | 27     | 73                  |
| Totals, . . .     | 34                  | 45    | 373   | 452    | 23                      | 276    | 299    | 14                 | 115    | 129    | 355                 |



*Summary of Lengths petitioned for and laid out, by Counties, together with Percentage of Lengths laid out to Lengths petitioned for.*

| COUNTIES.       | LENGTHS<br>PETITIONED FOR. |          | LENGTHS LAID OUT. |        |         |        |           |        | Percentage. |
|-----------------|----------------------------|----------|-------------------|--------|---------|--------|-----------|--------|-------------|
|                 |                            |          | 1894-97.          |        | 1898.   |        | TOTAL.    |        |             |
|                 | Feet.                      | Miles.   | Feet.             | Miles. | Feet.   | Miles. | Feet.     | Miles. |             |
| Barnstable, . . | 361,992                    | 68.56    | 97,170            | 18.40  | 18,944  | 3.59   | 116,114   | 21.99  | 32.07       |
| Berkshire, . .  | 424,768                    | 80.45    | 74,080            | 14.03  | 12,374  | 2.34   | 86,454    | 16.37  | 20.34       |
| Bristol, . . .  | 482,385                    | 91.36    | 72,184            | 13.67  | 9,738   | 1.84   | 81,922    | 15.51  | 16.98       |
| Dukes, . . .    | 119,635                    | 22.66    | 39,437            | 7.47   | -       | -      | 39,437    | 7.47   | 32.96       |
| Essex, . . .    | 684,304                    | 129.60   | 60,079            | 11.38  | 22,076  | 4.18   | 82,155    | 15.56  | 12.01       |
| Franklin, . .   | 349,521                    | 66.20    | 49,403            | 9.35   | 23,488  | 4.45   | 72,891    | 13.80  | 20.85       |
| Hampden, . .    | 420,385                    | 79.62    | 64,292            | 12.18  | 9,845   | 1.87   | 74,137    | 14.05  | 17.65       |
| Hampshire, . .  | 263,618                    | 49.93    | 49,553            | 9.38   | 12,931  | 2.45   | 62,484    | 11.83  | 23.69       |
| Middlesex, . .  | 1,079,431                  | 204.44   | 96,666            | 18.31  | 38,485  | 7.29   | 135,151   | 25.60  | 12.52       |
| Nantucket, . .  | 34,185                     | 6.47     | 22,270            | 4.23   | -       | -      | 22,270    | 4.23   | 65.08       |
| Norfolk, . .    | 428,064                    | 81.07    | 60,326            | 11.42  | 9,540   | 1.81   | 69,866    | 13.23  | 16.32       |
| Plymouth, . .   | 373,592                    | 70.76    | 96,734            | 18.32  | 13,889  | 2.63   | 110,623   | 20.95  | 29.61       |
| Suffolk, . .    | 57,550                     | 10.90    | 3,045             | .58    | -       | -      | 3,045     | .58    | 5.32        |
| Worcester, . .  | 1,159,087                  | 219.52   | 161,250           | 30.54  | 54,042  | 10.24  | 215,292   | 40.78  | 18.49       |
| Totals, . .     | 6,238,517                  | 1,181.54 | 946,489           | 179.26 | 225,352 | 42.68  | 1,171,841 | 221.94 | 18.79       |

Laid out on county petitions, 260,362 feet (49.31 miles).

Laid out on city petitions, 84,203 feet (15.95 miles).

Laid out on town petitions, 827,271 feet (156.68 miles).

Average distance petitioned for, 13,802 feet (2.61 miles).

Average length laid out, 3,301 feet (.63 mile).

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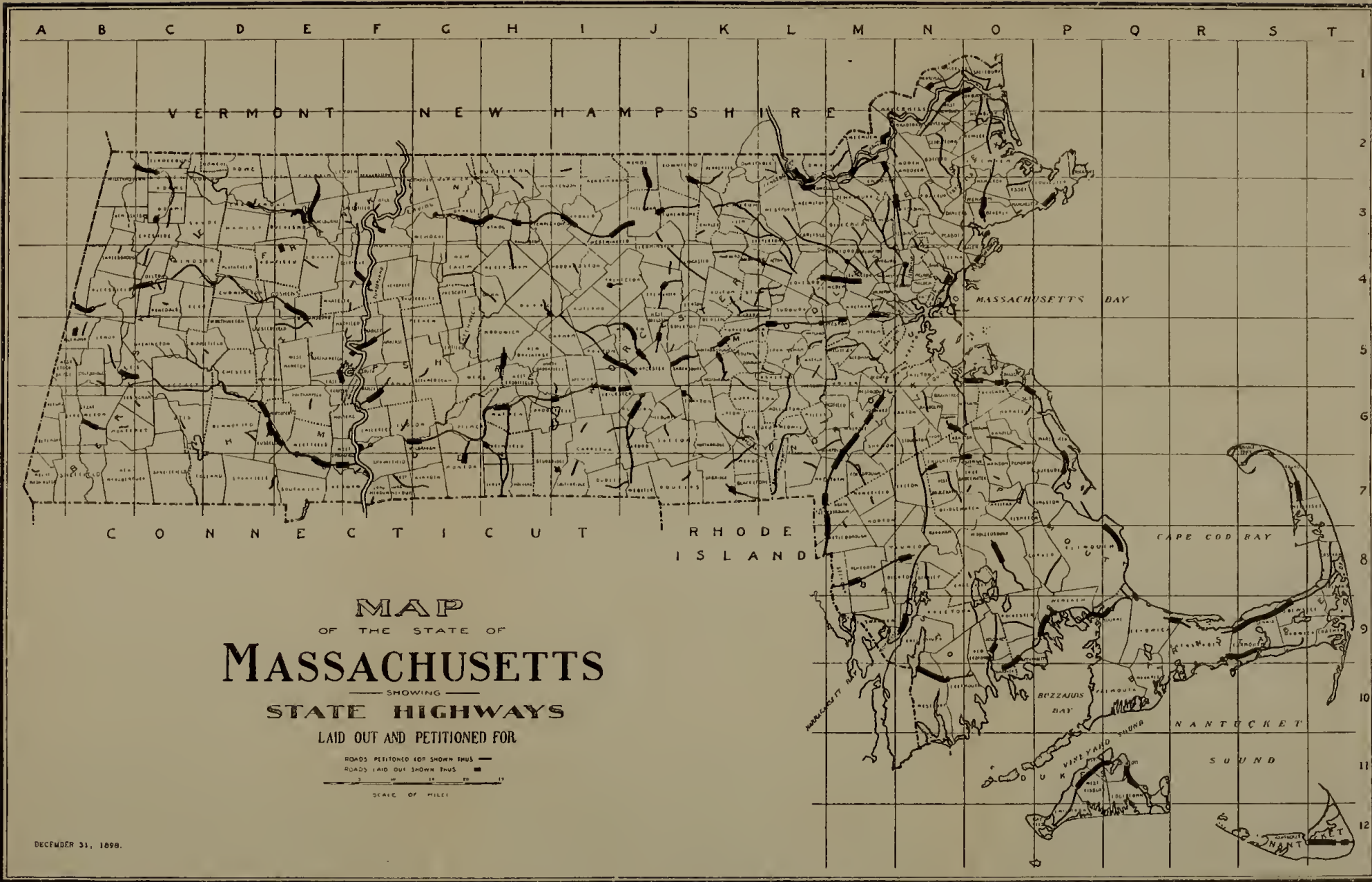
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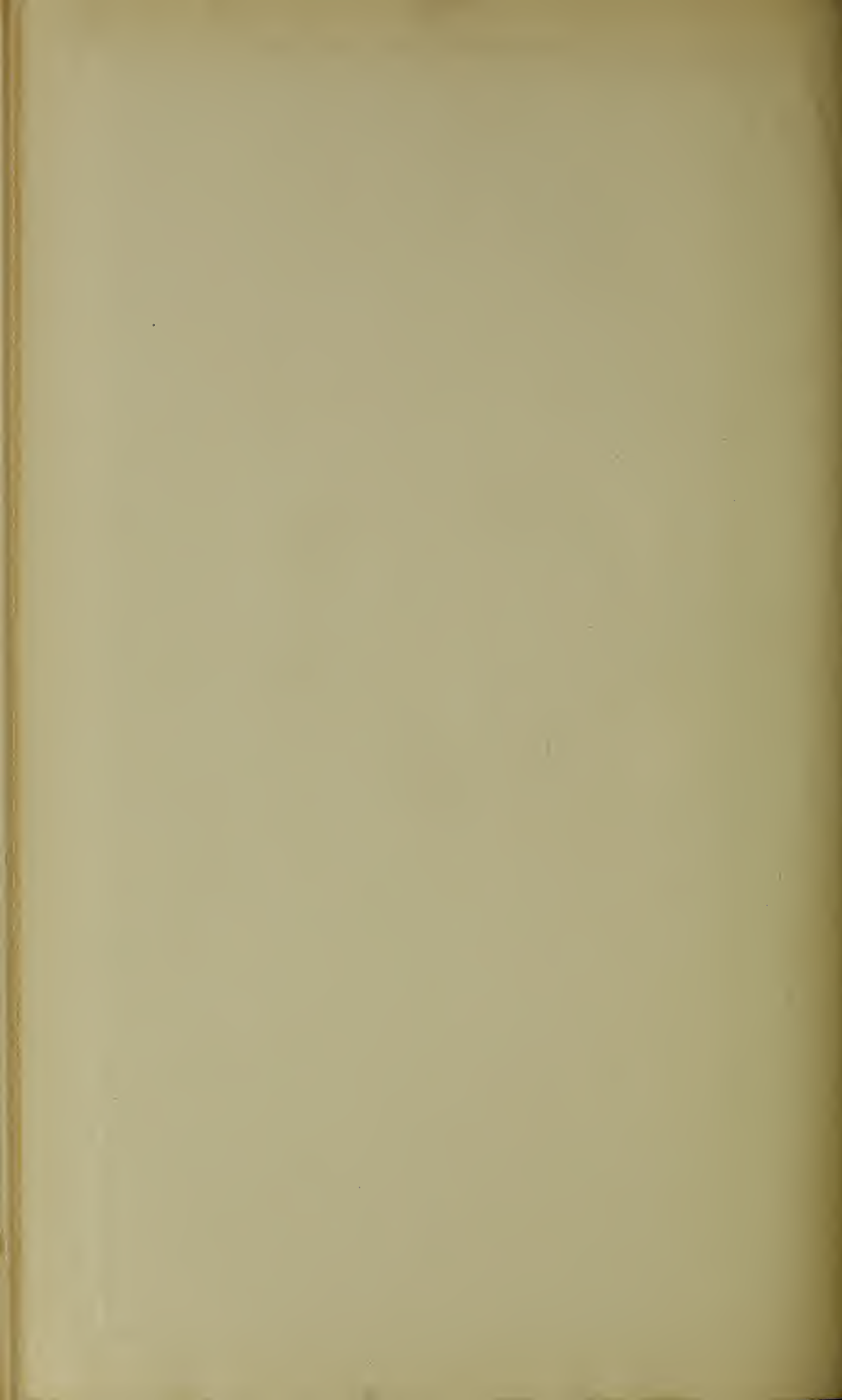












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